

A Study on Influencing Factors of Child Physical Activities

ဒီသုတေသနစာတမ်းမှာ သုံးထားတဲ့ **Research Methodology** (သုတေသနနည်းလမ်း)

အကြောင်းကို မြန်မာလို အသေးစိတ် ရှင်းပြပေးပါမယ်။

သုတေသန ဒီဇိုင်း (Research Design)

- **နမူနာရွေးချယ်နည်း (Sampling Method):** ဒီသုတေသနမှာ **လွယ်ကူရိုးရှင်းသော ကျပမ်းနမူနာယူနည်း (Simple Random Sampling Method)** ကို သုံးထားပါတယ်။
 - ဆိုလိုတာက လေ့လာမယ့် လူဦးရေထဲက (၆ နှစ်မှ ၁၂ နှစ်အရွယ် ကလေး ၂၉၀ ယောက် ရှိတယ်) ကနေ ကလေးတစ်ယောက်ချင်းစီကို **အခွင့်အလမ်းညီမျှစွာ** ရွေးယူထားတာဖြစ်ပါတယ်။
 - မိသားစု ၃၅၀ အိမ်ထဲက ကလေးရှိတဲ့ ၂၉၀ အိမ်ကို ရွေးပြီး၊ အိမ်တစ်အိမ်မှာ ကလေးတစ်ယောက်ကျ ယူထားတာပါ။
- **နမူနာအရေအတွက် (Sample Size):** နမူနာအရေအတွက်ကို **Yamane's formula** နဲ့ တွက်ထားပါတယ်။
 - လူဦးရေ ၂၉၀၊ Sampling error ၅% (0.05) ယူထားတဲ့အတွက် အနည်းဆုံး နမူနာ ၁၆၈ ယောက် လိုအပ်ပါတယ်။
 - ဒါပေမယ့် ပိုပြီး ယုံကြည်ရမှုရှိအောင် ကလေး **၂၀၇ ယောက်** ကို စစ်တမ်းကောက်ယူထားပါတယ်။
- **ဒေသနဲ့ အချိန် (Area and Duration):** ဒီသုတေသနကို **မြောက်ဒဂုံ မြို့နယ်၊ ရပ်ကွက် (၃၂)** မှာ နေထိုင်တဲ့ ၆ နှစ်မှ ၁၂ နှစ်အရွယ် ကလေးတွေကို **၂၀၂၀ ခုနှစ်၊ အောက်တိုဘာလကနေ ဒီဇင်ဘာလအတွင်း** လုပ်ဆောင်ခဲ့တာဖြစ်ပါတယ်။

ဒေတာကောက်ယူနည်း (Data Collection Method)

- **စစ်တမ်းမေးခွန်းလွှာ (Questionnaire):** ဒေတာကောက်ယူဖို့အတွက် **မေးခွန်းလွှာ (Questionnaire)** ကို သုံးထားပါတယ်။

- မေးခွန်းပေါင်း ၃၁ ခု ပါဝင်ပြီး အောက်ပါအပိုင်းတွေ ပါဝင်ပါတယ်။
 1. **ကလေးရဲ့ ကိုယ်ရေးကိုယ်တာ အချက်အလက် (Demographics):** အသက်၊ ကျား/မ၊ ပညာရေးအဆင့်၊ မိဘ၏ လစာဝင်ငွေ။
 2. **ကိုယ်လက်လှုပ်ရှားမှု လုပ်ငန်းစဉ် (PA Characteristics):** ဘယ်လိုကစားနည်းတွေ ကစားလဲ၊ တစ်နေ့ကို မိနစ်ဘယ်လောက် ကစားလဲ။
 3. **မိဘထောက်ပံ့မှု (Parental Support):** မိဘက ကစားခွင့်ပြုသလား၊ ကစားကွင်းသွားခွင့်ပြုသလား၊ သူငယ်ချင်းရဲ့အိမ်မှာ ကစားခွင့်ပြုသလား၊ ကိုယ်လက်လှုပ်ရှားမှုရဲ့ အကျိုးကျေးဇူးတွေကို ပြောပြသလား။
 4. **ပတ်ဝန်းကျင် (Environment):** ကလေးမှာ အသက်တူရွယ်တူ ကစားဖော်ရှိသလား။ ဘေးကင်းတဲ့ ကစားရာနေရာ ရှိသလား။
- **မေးခွန်းအမျိုးအစားများ:** Close-ended question (ရွေးစရာတွေပါတာ)၊ **လိုက်ကတ်စကေး (Likert Scale)** (Never, Rarely, Sometimes, Often, Always) စတာတွေနဲ့ မေးထားပါတယ်။

ဒေတာ ခွဲခြမ်းစိတ်ဖြာနည်း (Data Analysis Methods)

စာတမ်းမှာ ဒေတာတွေကို ခွဲခြမ်းစိတ်ဖြာဖို့ အောက်ပါ **စာရင်းအင်းနည်းလမ်း (Statistical Methods) (၃) မျိုး** ကို အသုံးပြုထားပါတယ်။

၁။ ဖော်ပြချက် စာရင်းအင်း (Descriptive Statistics)

- **ဘာအတွက် သုံးလဲ:** နမူနာကလေးတွေရဲ့ အခြေခံအချက်အလက်တွေကို စုစည်းပြီး ရှင်းလင်းတင်ပြဖို့။
- **ဥပမာ:** ကလေးတွေရဲ့ အသက်အလိုက် ဖြန့်ဖြူးမှု၊ ကျား/မ အချိုး၊ ပညာရေးအဆင့်၊ မိဘဝင်ငွေ၊ ဘယ်နှရာခိုင်နှုန်းက လှုပ်ရှားမှုလုပ်တယ်/မလုပ်ဘူး စတာတွေကို **ဇယားနဲ့ ဂရပ်ပုံစံ** တွေနဲ့ ပြသထားပါတယ်။

၂။ Chi-square Test

- ဘာအတွက် သုံးလဲ: ကိုယ်လက်လှုပ်ရှားမှု (Active PA) နဲ့ အခြားအချက်အလက်တွေ (ဥပမာ- အသက်၊ ပညာရေး၊ မိဘဝင်ငွေ) တို့ကြားမှာ ဆက်စပ်မှု ရှိ/မရှိ ကို စစ်ဆေးဖို့။
- ရလဒ်: ဒီစမ်းသပ်ချက်အရ ကလေးရဲ့အသက်၊ ပညာရေး၊ မိဘဝင်ငွေ၊ မိဘက အကျိုးကျေးဇူးပြောပြမှု စတာတွေနဲ့ ကိုယ်လက်လှုပ်ရှားမှုကြားမှာ ဆက်စပ်မှုအမှန်တကယ်ရှိတယ် လို့ တွေ့ရပါတယ်။

၃။ Binary Logistic Regression Model

- ဘာအတွက် သုံးလဲ: ဒါကတော့ ဒီစာတမ်းရဲ့အဓိက ခွဲခြမ်းစိတ်ဖြာမှု ဖြစ်ပါတယ်။
ဘာအတွက်လဲဆိုတော့...
 - ရလဒ်နဲ့ အကြောင်းရင်းတွေကြားက ဆက်သွယ်မှုကို ခန့်မှန်းတဲ့ မော်ဒယ်တစ်ခု တည်ဆောက်ဖို့ပါ။
 - ရလဒ် (Dependent Variable) က ကလေး ကိုယ်လက်လှုပ်ရှားလား/မလှုပ်ရှားဘူးလား (Active PA / Not Active PA) ဆိုတဲ့ အဖြေ နှစ်မျိုးတည်းရှိတဲ့ ကိစ္စမှာ သုံးပါတယ်။ (WHO ရဲ့အကြံပြုချက်ဖြစ်တဲ့ တစ်နေ့ ၆၀ မိနစ်နဲ့ယှဉ်ပြီး သတ်မှတ်ထားပါတယ်)
 - အကြောင်းရင်း (Independent Variables) တွေကတော့ အသက်၊ ပညာရေး၊ မိဘဝင်ငွေ၊ မိဘက အကျိုးကျေးဇူးပြောပြမှု စတာတွေ ဖြစ်ပါတယ်။
- ဘာကို ရှာဖွေလဲ: ဒီမော်ဒယ်ကနေ ဘယ်အချက်တွေက ကလေးရဲ့ ကိုယ်လက်လှုပ်ရှားမှုအပေါ် ဘယ်လောက်ထိ သက်ရောက်မှုရှိလဲ၊ သက်ရောက်မှုက အပြုသဘောလား/အနုတ်သဘောလား ဆိုတာကို ဖြစ်နိုင်ခြေ (Odds Ratio) အနေနဲ့ ပြောနိုင်ပါတယ်။

- **ဥပမာ:** "မိဘက PAရဲ့အကျိုးကျေးဇူး ဘယ်တော့မှ မပြောပြခံရတဲ့ကလေး" က "အမြဲပြောပြခံရတဲ့ကလေး" ထက် **ကိုယ်လက်လှုပ်ရှားဖြစ်နိုင်ခြေ ၁၈ ဆ** ပိုများတယ် စသဖြင့် တွေ့ရှိခဲ့ပါတယ်။

- **မော်ဒယ်ရဲ့ယုံကြည်ရမှု (Model Evaluation):** ဒီမော်ဒယ်က ယုံကြည်ရလားဆိုတာ စစ်ဆေးဖို့ **Hosmer and Lemeshow Test, Cox & Snell R Square, Nagelkerke R Square** စတဲ့ စစ်ဆေးချက်တွေ လုပ်ထားပါတယ်။ ရလဒ်တွေအရ ဒီမော်ဒယ်ဟာ **အလွန်ကောင်းမွန်ပြီး** ကလေးရဲ့ကိုယ်လက်လှုပ်ရှားမှုကို ၈၇.၁% အထိ ရှင်းပြနိုင်စွမ်းရှိတယ်လို့ ဆိုထားပါတယ်။

အတိုချုပ်ပြောရရင်

ဒီသုတေသနက **မြောက်ဒဂုံ ရပ်ကွက်(၃၂) က ကလေးတွေရဲ့ကိုယ်လက်လှုပ်ရှားမှုကို ဘယ်အရာတွေက လွှမ်းမိုးသလဲ** ဆိုတာကို လေ့လာထားတာဖြစ်ပါတယ်။ **လွယ်ကူရိုးရှင်းသော ကျပ်မန်းနမူနာယူနည်း** သုံးပြီး **မေးခွန်းလွှာ** နဲ့ ဒေတာကောက်ယူကာ၊ **ဖော်ပြချက်စာရင်းအင်း၊ Chi-Square Test** စစ်ဆေးချက်နဲ့ **Binary Logistic Regression** ဆိုတဲ့ စာရင်းအင်းနည်းလမ်း (၃) မျိုးကို အသုံးပြုပြီး ခွဲခြမ်းစိတ်ဖြာထားတာ ဖြစ်ပါတယ်။

**YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF STATISTICS
MASTER OF APPLIED STATISTICS PROGRAMME**

**A STUDY ON INFLUENCING FACTORS OF
CHILD PHYSICAL ACTIVITIES
(Case Study in Ward (32), North Dagon Township, Yangon Region)**

**HELEN PHYO
MAS - 9
MAS 2nd BATCH**

SEPTEMBER, 2023

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ACCEPTANCE

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ABSTRACT

This thesis attempts to identify the influencing factors on physical activity (PA) of children who aged from 6 years to 12 years, are living in ward (32), North Dagon township, Yangon Region. The simple random sampling method was applied. The data were collected from individual respondents of 207 children in 2020. The statistical method of Descriptive statistics, Chi-square test statistics and Binary Logistic Regression model were deployed to develop the results of the study. The dependent variable of the thesis is children active PA. The independent variables of child age, education, income amount of children's parents, parents tell PA's benefits, parents allows doing PA at friend's home, children have same age friend and children access safe space for doing PA has positive impact on the children active PA. This thesis could find only seven factors are influencing on the child active PA. In reality, there may be more factors which are influencing the children active PA. This thesis highlights the independent variable of parents tell PA's benefits (never) influence positively on the children active PA. It articulates that children who are never told PA's benefits are more active in PA although it was supposed to be negative effect. This thesis doesn't cover to know the reason for having positive effect. Moreover, what kinds of PA's benefits are told to the children by their parents are not covered in this study.

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LIST OF ABBREVIATIONS

BLR	Binary Logistic Regression
DHHS	Department of Health and Human Services
DV	Dependent variables
IV	Independent variable
LR	Likelihood Ratio
LS	Likert Scale
OLR	Ordinary Likelihood Ratio
PA	Physical Activity
PB	Parental Behavior
PD	Physical Development
PE	Parental Encouragement
PE	Physical Education
PI	Parental Influence
PS	Parental Support
SE	Standard Error
VIF	Variance Inflation Factor
WHO	World Health Organization

CHAPTER I

INTRODUCTION

Children's Physical Activity (PA) is an important guarantee for children's physical and mental health. Regular physical activities can help children and adolescents improve cardiorespiratory fitness, build strong bones and muscles, control weight, reduce symptoms of anxiety and depression, and reduce the risk of developing health conditions such as: heart disease, cancer, type 2 diabetes, high blood pressure and osteoporosis. According to the World Health Organization (WHO), it recommends that a child should have a minimum of 60 minutes of doing PA in their daily life. Any physical activities of Aerobic, muscle-strengthening and bone-strengthening are recommended to do in the daily life of the children. All types of PA contribute to five key areas of child development, gross motor skills, fine motor skills, cognitive and intellectual and social and emotional skills. To promote the child to an active PA, the role of their parent support is essential. Parents could influence directly or indirectly on child active PA by their role modeling, social influence, and social support (Gregory J. Welk et al., 2003).

1.1 Rationale of the Study

According to numerous studies and expert consensus, Physical Activity (PA) is widely recognized for its positive impact on various aspects of children and youth well-being, including cognitive, physical, social, and emotional development (World Health Organization, 2020; Tremblay et al. 2016). In the case of children, PA plays a particularly crucial role in enhancing gross and fine motor skill development, which is essential for academic performance and self-perceived competence, both academically and athletically (Donnelly et al. 2016; Pesce et al. 2019). Moreover, engaging in physical activities has been associated with improved socioemotional adjustment and self-esteem among children (Biddle et al. 2018). Participating in group activities and games not only offers children opportunities to learn new skills but also facilitates the development of friendships and social interactions (Bailey et al. 2019). The World Health Organization (2020) highlights the social benefits of PA, emphasizing that it can contribute to the social development of children and young people. Furthermore, research suggests that physically active children and young people are more likely to

adopt other healthy behaviors, such as avoiding tobacco, alcohol, and drug use (Telama et al. 2014). Additionally, physically active youth tend to demonstrate higher academic performance in school (Donnelly et al., 2016; Rasberry et al. 2011). The World Health Organization (2020) supports this notion, indicating that PA is positively associated with psychological benefits in children and young people.

The importance of physical education (PE) and holistic development in children's lives cannot be overlooked. While academic achievement is often prioritized, it is essential to recognize the significance of physical, social, emotional, leadership, and spiritual skills for children's overall success and well-being within diverse communities (World Health Organization, 2017). Unfortunately, many children experience limitations in accessing PE due to curriculum constraints and insufficient emphasis on its importance within the school system. Moreover, modern sedentary behaviors, such as excessive television viewing, computer gaming, internet usage and excessive studying, contribute to a decline in children's physical health (Tremblay et al. 2011). Parental influence (PI) is a crucial factor in shaping children's physical activity levels. Studies by Welk, Wood, and Morss highlight two important aspects of parental behavior (PB) that promote physical activity in children: role modeling and parental support (PS). Role modeling includes parents' own interest and efforts in being physically active, while parental support (PS) encompasses encouragement, involvement, and facilitation of physical activity opportunities for children (Welk et al. 2003).

Urban areas, characterized by high population density, often lack sufficient play areas or playgrounds, limiting children and young people's access to safe spaces for physical activities (Veitch et al. 2017). Additionally, a lack of understanding regarding the importance of physical activity in child well-being contributes to a missed opportunity for children to learn and benefit from various forms of physical activities (World Health Organization, 2017). It is recommended that children engage in at least 60 minutes of physical activity per day, as defined by the World Health Organization (2017). These activities encompass a wide range of movements requiring energy expenditure, such as running, swimming, throwing, climbing, cycling, and participating in sports. It is important to address the societal challenge of high living costs, which can lead to the neglect of the developmental benefits associated with physical activity for children. By recognizing and prioritizing the long-term advantages of physical

activity, not only for physical development (PD) but also for overall well-being, can ensure a brighter future for our children (World Health Organization, 2017).

According to the recommendation of WHO, it mentions that children have to have at least 60 minutes of spending time on doing physical activities that contribute to well-being of children. Moreover, it is essential to obtain a comprehensive understanding of the local context, including the factors that influence children's physical activities, in order to design effective programs that meet the need of children to do physical activities. Therefore, this study aims to explore the influencing factors on children's physical activities to create better opportunities for increasing children active PA in their childhood.

1.2 Objectives of the Study

The objectives of the study are:

- (i) To investigate the demographic, socioeconomic and physical activity characteristics of the children.
- (ii) To examine the relationship between demographic and socioeconomic characteristics of the children and their physical activity characteristics.
- (iii) To analyze the factors associated with physical activity participation among children.

1.3 Method of Study

In this study simple random sampling method was used to collect the primary data from between 6 years and 12 years in Ward (32), North Dagon Township, Yangon Region. To present the result of the study, descriptive statistics was used to investigate the biography of children and characteristics of children's physical activities. Pearson Chi-square test was applied to examine the relationship between social, economic, demographic variables, norms and child active PA. Binary logistic regression was used to analyze influencing factors on children's physical activities.

1.4 Scope and Limitations of the Study

The study focuses on collected primary data from individual respondents, who aged from 6 years to 12 years, are living in Ward (32), North Dagon Township, Yangon region. The data was being collected from October to December 2020. There are 350

households, however; there are 290 households have children aged between 6 years and 12 years. In this thesis, only one child was selected in each selected household. According to the determination of sample size, the at least 168 children should be collected. However, there are 207 children studied to examine the influencing factors on children active PA.

1.5 Organization of the Study

This study is organized into five chapters. Chapter 1 consists of rationale of the study, objectives of the study, method of study, scope and limitations of the study and organization of the study. Chapter 2 presents an overview of relevant literature and existing research findings. Chapter 3 describes the selected methodology for this study, explaining the details of the data analysis techniques employed. Chapter 4 presents the analysis of collected data and the findings derived from the study. Finally, the conclusions of the study with findings and suggestions are described in chapter 5.

CHAPTER II

LITERATURE REVIEW

This chapter describes the overview of PA of children, factors associated with children's physical activities that contribute a lot to the development state of a child. The facts of previous studies are compiled and presented to indicate how the aim of the study is essential to support the children being physically active. Moreover, the information of previous study will support to draw the understanding of knowing how the factors of parents' support, parents' engagement in playing with their child, parents allow their child to play outside and friend's home, parents doing exercises, parents tell child the benefit of physical activities, having enough playing space in home, and accessing the safe playing space are influencing on children's physical activities. All information is reference to smooth the aim of the study, and to meet the objectives of the study for getting the findings and suggestions of the study.

2.1 Physical Activity (PA)

Physical activity is defined as any voluntary bodily movement produced by skeletal muscles that require energy expenditure. Physical activity encompasses all activities, at any intensity, performed during any time of day or night. It includes both exercise and incidental activity integrated into daily routine. According to the Department of Health and Human Services (DHHS), physical activity is any body movement that works your muscles and requires more energy than resting. Physical activity generally refers to movement that enhances health. Physical activity is recommended for everyone from 3 years of age and older. Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure (Caspersen et al. 1985). Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities produced by skeletal muscles that results in energy expenditure (Caspersen et al. 1985). Physical activity involves people moving, acting and performing within culturally specific spaces and contexts, and influenced by a unique array of interests, emotions, ideas, instructions and relationships (Dr Piggin, 2019). The WHO defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get and

from places, or as part of a person's work. Both moderate- and vigorous-intensity physical activity improve health. Regular physical activity is proven to help prevent and manage noncommunicable diseases such as heart disease, stroke, diabetes and several cancers. It also helps prevent hypertension, maintain healthy body weight and can improve mental health, quality of life and well-being. The WHO recommends that children and adolescents aged 5-17 years should do PA at least an average of 60 minutes per day of moderate-to-vigorous intensity, mostly aerobic, physical activity, across the week. This study applied the definition and recommendations of WHO.

2.2 Physical Activity Benefits in Child Well-being

According to World Health Organization (WHO), it suggests that a child should have at least 60 minutes of spending time on doing physical activities that contribute a lot to well-being of children. Having enough time of spending on doing physical activities has impacts on the significant benefit of child's health which are preventing and managing non communicable diseases, reduce symptom of depression and anxiety. Moreover, it enhances thinking, learning and judgment, ensures healthy growth and development in young people and improves overall well-being activities of children.

Physical activity (PA) plays a crucial role in promoting the overall well-being of school-aged children and youth. Several studies have explored the health benefits associated with physical activity and fitness in this population. Janssen and LeBlanc (2010) conducted a systematic review and highlighted the positive impacts of physical activity and fitness on the health of children and youth. Their findings emphasized the importance of engaging in regular physical activity for promoting optimal physical health and well-being in this age group.

Tremblay et al. (2020) conducted a comprehensive assessment of physical activity levels in children across 15 countries. Their study provided a global matrix of grades that compared the physical activity behaviors of children in different nations. The findings underscored the need for promoting increased PA participation among children to improve their overall health and well-being.

The implementation of PA breaks in classroom settings is an area of interest in promoting PA among children. Carlson et al. (2015) examined the contextual factors related to the successful implementation of classroom physical activity breaks. Their study highlighted the importance of supportive environments and teacher engagement

in facilitating regular PA breaks, thereby promoting the physical well-being of children within the school setting.

In addition to physical health benefits, PA has also been found to have positive effects on children's mental health. Biddle, Asare, and Pearson (2020) conducted a systematic review of longitudinal studies to investigate the relationship between children's PA and mental health. Their findings demonstrated that higher levels of PA were associated with better mental health outcomes in children, emphasizing the importance of incorporating PA in promoting mental well-being.

Long-term tracking studies have provided insights into the continuity of PA behaviors from childhood to adulthood. Telama et al. (2005) conducted a 21-year tracking study to examine the stability of physical activity levels over time. Their study revealed that PA habits established in childhood tend to persist into adulthood, highlighting the long-term implications of promoting physical activity during childhood for lifelong health benefits.

These studies collectively contribute to the understanding of the various aspects of physical activity and its positive impacts on children's well-being. They emphasize the importance of promoting physical activity in children for enhancing physical health, mental health, academic performance, and establishing lifelong habits of physical activity.

2.3 Influences on Child Physical Activity

Parental influence (PI) plays a vital role in shaping children's physical activity behaviors. Numerous studies have examined the impact of parental factors on child physical activity levels and participation. This literature review highlights key findings from relevant research in this area.

One influential study by Sallis et al. (2000) investigated various factors influencing the levels of physical activity among children. This study based on the data extracted from the reviewed studies revealed a multitude of correlates that influence physical activity behaviors among children. The method of systematic approaches to review and extensive range of literature, encompassing studies from various geographical regions, cultures, and demographic backgrounds. The findings indicated the necessity of a holistic approach to promoting physical activity among children.

Another study conducted by Davison et al. (2003) explored the impact of parental modeling on child physical activity behaviors. The study examined the collected data from a diverse sample of adolescent girls across a range of ages: 9, 11, 13, and 15 years from various schools and communities, ensuring a representative sample. By using a longitudinal design, parent and peer support for physical activity was assessed using validated questionnaires. The researchers found that children were more likely to engage in physical activity when their parents participated in regular physical activity themselves. The study highlighted the significance of parental role modeling as a means to motivate and inspire children to adopt an active lifestyle.

In a systematic review by Beets et al. (2010), various aspects of parental influence on child physical activity were examined. The review identified several key factors associated with parental influence, including parental support, role modeling, and access to resources and opportunities for physical activity. The study emphasized the importance of these factors in shaping children's physical activity behaviors.

Additionally, a study by Trost et al. (2002) explored the influence of parental support on children's physical activity levels. A total of 245, 3-to 5-year-olds (127 girls, 118 boys) and their parent(s) (242 mothers, 173 fathers) recruited from nine preschools. The study design of cross-sectional study was used in this study. The researchers found that parental support, including providing transportation, participating in physical activities together, and enrolling children in organized sports, was positively associated with higher levels of physical activity in children. The study highlighted the significant role parents play in facilitating and promoting their children's physical activity engagement.

Furthermore, a study by Edwardson and Gorely (2010) examined the impact of parental encouragement on child physical activity. A comprehensive search was conducted across major academic databases to identify peer-reviewed studies focusing on parental influences on youth physical activity who aged of 5 to 18 years. Studies employing quantitative, qualitative, and mixed-methods approaches were considered. The findings indicated that parental encouragement, particularly in the form of positive reinforcement and praise, was associated with increased physical activity levels in children. The study emphasized the importance of parental encouragement as a motivational factor for children to engage in regular physical activity.

Collectively, these studies underscore the influential role of parents in shaping children's physical activity behaviors. Parental support, role modeling, encouragement, and the provision of resources and opportunities all contribute to higher levels of physical activity in children. Understanding and harnessing the power of parental influence can inform effective interventions and strategies to promote and sustain children's physical activity habits.

2.4 Review on Previous Studies

The relationship between children physical activity and independent variable (IV) of parental influence and encouraging environment has been widely investigated in the literature. This literature review provides an overview of key findings from relevant studies in this area.

One influential study by Trost et al. (2003) examined the relationship between parental support and child physical activity levels. The sample consisted of 380 students in grades 7 through 12 and their parents. Data collection took place during the fall of 1996. The model was tested via observed variable path analysis using structural equation modeling techniques (AMOS 4.0). The researchers found that the children who received greater parental support, including encouragement, provision of transportation, and participation in physical activities together, demonstrated higher levels of physical activity. The study highlighted the positive impact of parental support on promoting child physical activity engagement.

A systematic review conducted by van Sluijs et al. (2007) explored the relationship between parental influences and child physical activity behaviors. The data analyzed in this systematic review comprised a diverse range of research articles investigating the link between parental influences and child physical activity behaviors. The review revealed that parental modeling, support, and encouragement were consistently associated with higher levels of child physical activity. The study emphasized the importance of parental influence in shaping children's physical activity habits.

Another study by Jago et al. (2009) explored the influence of the family environment and socioeconomic context might influence the engagement of children in physical activities. The researchers employed a comprehensive methodology to investigate the physical activity behaviors of 10-11 years old children. A mixed-

methods approach was utilized, combining quantitative data collection and qualitative insights. The researchers found that certain family-related factors, such as parental encouragement (PE) and active role modeling, significantly influenced a child's likelihood to engage in physical activities. Additionally, the availability of safe and accessible spaces for physical activity, as well as access to organized sports, demonstrated notable impacts on the children's active behaviors. The socioeconomic context was found to play a crucial role, as children from lower socioeconomic backgrounds often faced barriers to participating in physical activities due to limited resources and opportunities.

Additionally, a study by Beets et al. (2010) investigated the impact of parental support on child physical activity behaviors. The results of the study were from an extensive review of existing literature to shed light on the influencing factors on child engagement in physical activities. The method of methodological approach was used to systematically examine a range of research articles, studies, and scholarly sources that investigate the influencing factors on child physical activity behavior. The findings indicated that factors such as age, gender, socioeconomic status and cultural backgrounds influence on the child engagement in child physical activity.

Furthermore, a study by Edwardson and Gorely (2010) examined the association between parental encouragement and child physical activity levels. In this study systematic review of cross-sectional and longitudinal research was deployed by collecting identified (n=96) using electronic database and manual searches of reference lists. The findings indicated that parental encouragement (PE), particularly through positive reinforcement and praise, was positively correlated with higher levels of physical activity in children. The study underscored the role of parental encouragement as a motivating factor for children to engage in regular physical activity.

Tandon et al. (2011) undertook a study to investigate the impact of the home environment, including the availability of equipment and parental support, on children's physical activity levels. Employing a longitudinal design, the study assessed changes in physical activity over time. The findings of this research illuminated the positive influence of a supportive home environment on child physical activity behaviors. Hinkley et al. (2012) conducted an inquiry into the relationship between screen time (involving activities like watching TV, using computers, and playing video games) and physical activity in children. Their study revealed a negative association between

excessive screen time and physical activity levels in children, underscoring the importance of parental monitoring and the necessity of restricting screen time. In their study, Jago et al. (2013) explored the effects of family and peer influences on physical activity among children. Their investigation highlighted the significant roles played by both family and peer support in promoting physical activity in children, with a particular emphasis on the crucial role of parental involvement.

Salmon et al. (2015) conducted research to assess the impact of interventions conducted in school and family settings on children's physical activity levels. Their findings indicated that interventions involving both schools and families were more effective in increasing physical activity levels among children compared to interventions targeting only one of these environments.

Carson et al. (2017) delved into the relationship between parental modeling of physical activity and children's engagement in physical activity. Their results demonstrated that children were more likely to engage in physical activity when their parents served as active role models, underscoring the pivotal role of parental behavior in influencing children's activity levels.

Ranchod et al. (2019) investigated the influence of neighborhood safety and access to parks on child physical activity. Their study shed light on the significance of the built environment in either promoting or hindering children's physical activity behaviors, with a specific focus on the role of parents in facilitating safe outdoor play.

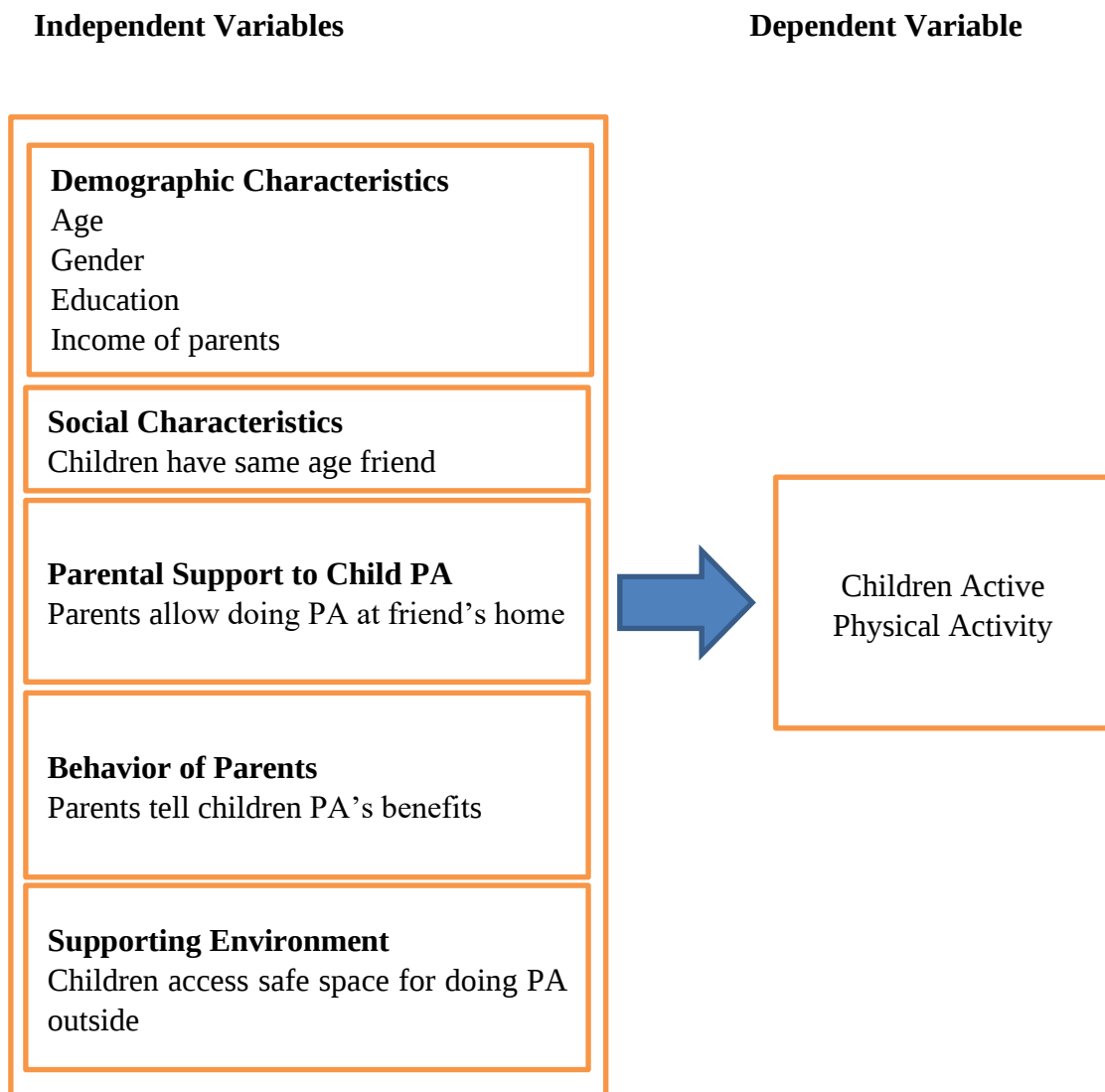
O'Connor et al. (2020) conducted a study examining the impact of parental involvement in organized sports on child physical activity levels. The research findings suggested that children who participated in organized sports with active parental involvement were more likely to maintain higher levels of physical activity.

Collectively, these studies demonstrate the strong relationship between child physical activity and parental influence and encouraging environment. Parental support, encouragement, role modeling, and provision of resources and opportunities all contribute to higher levels of physical activity in children. Understanding and harnessing the power of influencing factors can inform effective interventions and strategies to promote and sustain children's physical activity behaviors.

2.5 Analytical Framework of the Study

The analytical framework below shows the various factors that will be conceptualized to independently affect children's physical activities status of having enough spending time of PA. The factors were categorized into child, parents and supporting environment.

Figure (2.1) Analytical Framework for PA of Children



Source: Survey Data (2020)

According to the above analytical framework, the study considers children's physical activities as the dependent variable. The dependent variable known as spending time of children doing physical activities is more than 60 minutes in their daily life. Regarding the recommendation of World Health Organization (WHO), they suggest that a child who gets minimum 60 minutes of doing physical activities ensure

of having good well-being in their growth. As the demographic, the independent variables of age, gender and education of children and income of children's parents are studied to identify the influencing factors on child active PA. For social, the independent variable of having same age for doing PA is considered in the study. As parental support to child's PA, two independent variables of parent allow do PA at friend's home is studied to examine the influencing factors on outcome variable of child active PA. For behavior of parent, parent tells PA's benefits is taken to study the influencing factor on child active PA. As supporting environment, the independent variable of accessing the safe space for doing PA outside is studied to know the influencing factor on the dependent variable of child active PA.

CHAPTER III

RESEARCH METHODOLOGY

In this chapter, survey design, determination of sample size, questionnaire design, binary logistic regression model, log transformation, assumptions of binary logistic regression model, overall model evaluation, assessment of fitted binary logistics regression model and description of variables are presented.

3.1 Survey Design

The study spanned from October 2020 to December 2020 and focused on children between the ages of 6 and 12 residing in the slum area adjacent to Ward (32) of North Dagon Township, located in the Yangon East District of the Yangon Region. The study encompassed a total of 207 children from 6 years to 12 years, irrespective of their school enrollment status, ethnicity, or religious background. The survey design of the study was simple random sampling design.

3.2 Determination of Sample Size

The data from respondents who aged from 6 years to 12 years were collected through the assistance of volunteers involved in a development intervention project. The total children who are aged between 6 years to 12 years is 290 from 350 households. To determine the sample size of this study, the Yamane's formula was used. Accordingly, the calculated number of sample size is 168. However, there are 207 children were studied to present the result of objectives of the study. The studied number of 207 children were selected by using the simple random sampling method. The at least required sample size was calculated as the following formula;

$$\begin{aligned}n &= \frac{N}{1+Ne^2} \\&= \frac{290}{1+290(0.05)^2} \\&= 168\end{aligned}$$

where N = the population size of interest

e = acceptable sampling error

n = required sample size

3.3 Questionnaire Design

Factor analysis and quantitative response regression models were used to interpret the collected data. The survey instrument is composed of 31 questions including the demographic question. The question type is closed end that is given the list of possible answer for type of PA, Likert scale which is required to choose one which is agreed by respondents to identify the characteristic of PA, parental support to PA, behavior of parents PA with child, status of accessing the safe outdoor place and having friends to do PA at outside. The minutes spend on PA by children is asked in the question and two groups were identified as enough daily PA who spend more than 60 minutes of doing PA daily otherwise not having enough PA time because WHO recommend that child have to get at least 60 minutes of spending on PA daily for the anonymous benefit effecting to developing in the life of childhood.

Data were collected about the predisposing, reinforcing and enabling factors to determine the predictors of PA by using the Children's Physical Activity. The questions were answered on a five-point Likert scale with participants selecting the answer most to their liking. The questionnaire had a demographic section related to age, gender, school grade and income amount of children's parent.

In the questionnaire design the session of demographic of children, social and characteristic of child PA, parental support and engagement in child PA, accessing safe PA space were included. For demographic of children, age, education and gender of children were collected. For social, the question of having same age friend with "yes", "no" question type was applied. For characteristic of child PA, the open question of how many minutes of PA a child does in their daily life was asked. For parental support and engagement in child PA, the question of parent tells PA's benefits, parent do exercises, parent do PA with child, parent allows doing PA at friend's home and outside were asked by five points Likert scale. For accessing safe PA space, the question of accessing enough space for doing PA at home and safe space in their living area were answered by individual respondent in the form of "yes", "no" answer type.

3.4 Binary Logistic Regression Model

The dependent variable in logistic regression is usually dichotomous, that is the dependent variable can take value 1 with a probability of success, $P(Y=1) = \pi$, or the value 0 with the probability of failure $P(Y=0) = 1 - \pi$. This type of variable is called a

Bernoulli (or binary) variable. In general, this model was employed to model the outcomes of a categorical dependent variable. The use of linear regression model for categorical variables was considered as inappropriate because the response values are not measured (ratio scale or quantitative values) and the error terms are not normally distributed (Rastogi & Singh, 2019). The major limitation of linear regression is that it cannot fit with the dependent variables that are categorical or dichotomous. Logistic regression assesses the impact of multiple independent variables simultaneously at a time on the categorical dependent variable.

The binary logistic regression model in the usual form is

$$Y_i = E(Y_i) + \varepsilon_i \quad (3.1)$$

For a binary dependent or response variable ‘Y’ and an independent or predictor variable ‘X’, the probability for the distribution of ‘Y’ can be written as:

$$P(Y = 1) = \pi$$

$$P(Y = 0) = 1 - \pi$$

The logistic regression model is therefore given as,

$$\pi_i = \frac{\exp(\sum_{j=1}^p \beta_j X_{ij})}{1 + \exp(\sum_{j=1}^p \beta_j X_{ij})} \quad (3.2)$$

Therefore, Equation (3.2) can be written as

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 X}}{1 + e^{\beta_0 + \beta_1 X}} \quad (3.3)$$

Equation (3.3) determines the binary logistic regression for a single independent variable. Here, the two regression constraints viz. the intercept, β_0 , and the regression parameter for X , β_1 , set the basis of the above mentioned model.

For a binary response variable ‘Y’, having ‘k’ number of independent variables $(x_1, x_2, \dots, x_k)$; $\pi(x)$ is used to represent the probability that $Y=1$ for having event and $1 - \pi(x)$ to represent the probability of not having event($Y=0$).

These probabilities are written as

$$\pi(X) = P(Y = 1 | X_1, X_2, \dots, X_k)$$

$$1 - \pi(X) = P(Y = 0 | X_1, X_2, \dots, X_k)$$

Since the distribution of the error term ε_i depends on the Bernoulli distribution of the response Y_i . The expected value of each Y_i is

$$E(Y_i) = \pi_i = \frac{\exp(\beta_0 + \beta_1 X_1 + \dots + \beta_i X_k)}{1 + \exp(\beta_0 + \beta_1 X_1 + \dots + \beta_i X_k)} \quad (3.4)$$

where, $E(Y_i)$ = conditional mean given the value of X_i

β_0 = the constant of the equation

β_i = the coefficient if the predictor variable i

An alternative form of the logistic regression equation is:

$$\log[\pi(X)] = \log\left[\frac{\pi_i}{1-\pi_i}\right] = \beta_0 + \beta_1 X_1 + \dots + \beta_i X_k \quad (3.5)$$

Binary logistic regression models the relationship between a set of independent variables and a binary dependent variable. It is useful when the dependent variable is dichotomous in nature, like death or survival, absence, or presence and so on. Independent variables can be categorical or continuous, for example, gender, age, income or geographical region. Binary logistic regression models a dependent variable as a logit of π , where π is the probability that the dependent variables take a value of 1.

Binary logistic regression models are used across many domains and sectors. For example, it can be used in marketing analytics to identify potential buyers of a product, in human resources management to identify employees who are likely to leave a company, in risk management to predict loan defaulters, or in insurance, where the objective is to predict policy lapse. All of these objectives are based on information such as age, gender, occupation, premium amount, purchase frequency, and so on. In all these objectives, the dependent variable is binary, whereas independent variables are categorical or continuous.

The equation below is a statistical model for binary logistic regression with a single predictor. The π is the probability that the dependent variable ‘Y’ will take the value 1, given the value of ‘X’, where X is the independent variable. The natural log of “ π divided by one minus π ” is called the logit or link function. The right-hand side is a linear function of X, very much similar to a linear regression model.

The general logistic regression model for a single predictor can be extended to a model with k predictors and is represented as given here. In this equation, π is the probability that Y equals one given X, where Y is the dependent variable and X’s are independent variables. B_0 to b_k are the parameters of the model, they are estimated

using the maximum likelihood method, which we'll discuss shortly. The left-hand side of the equation ranges between minus infinity to plus infinity.

The logit link or logit function is also known as the log of odds, where odds is the probability of success divided by the probability of failure. The estimated parameter gives the change in log of odds given one unit change in the independent variable.

3.5 Log Transformation

The log transformation is, arguably, the most popular among the different types of transformations used to transform skewed data to approximately conform to normality. Log transformations and sq. root transformations moved skewed distributions closer to normality. So what we are about to do is common.

This log transformation of the p values to a log distribution enables us to create a link with the normal regression equation. The log distribution (or logistic transformation of π is also called the logit of π or logit (π).

In logistic regression, a logistic transformation of the odds (referred to as logit) serves as the depending variable:

$$\text{Log (odds)} = \text{logit} (\pi) = \ln \left(\frac{\pi}{1-\pi} \right) \quad (3.6)$$

If we take the above dependent variable and add a regression equation for the independent variables, we get a logistic regression:

$\text{Logit} (\pi) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$ as in least-squares regression, the relationship between the logit (P) and X is assumed to be linear.

3.6 Assumptions of Binary Logistic Regression Model

In order to run binary logistic regression, there are seven assumptions that need to be considered. The first four assumptions relate to the choice of study design and the measurements to make, whilst other three assumptions relate to how the data fit the binary logistics regression model. These assumptions are;

- (i) It requires one dependent variable that is dichotomous (i.e., a nominal variable with two outcomes).
- (ii) It requires one or more independent variables that are measured on either a continuous or nominal scale.

- (iii) It requires independence of observations and the categories of the dichotomous dependent variable and all the nominal independent variables should be mutually exclusive and exhaustive.
- (iv) It also requires a bare minimum of 15 cases per independent variable, although some recommend as high as 50 cases per independent variables
- (v) There needs to be a linear relationship between the continuous independent variables and the logit transformation of the dependent variable.
- (vi) The data must not show multicollinearity. The multicollinearity can be detected through correlation coefficient, variance inflation factor (VIF) and tolerance, which will inform whether the data meets or violates this assumption.
- (vii) There should be no significant outliers, high leverage points or highly influential points.

3.7 Overall Model Evaluation

3.7.1 Pearson's Chi-squared Test

Pearson's Chi-squared test (χ^2) is a statistical test applied to test a null hypothesis stating that the frequency distribution of certain events observed in a sample is consistent with a particular theoretical distribution (Wikipedia, 2020). The events considered must be mutually exclusive and have total probability 1. A common case for this is where the events each cover an outcome of a categorical variable. The test-statistic is

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad (3.7)$$

O_{ij} = observed frequencies

$$E_{ij} = \text{expected frequencies} = \frac{\sum_{k=1}^c O_{ik} \sum_{k=1}^r O_{kj}}{N}$$

$\sum_{k=1}^c O_{ik}$ = Sum of the observed frequencies for i^{th} column

$\sum_{k=1}^r O_{kj}$ = sum of the observed frequencies for k^{th} row

N = total number of observations

3.7.2 Odds Ratio

The odds of success are the probability of success (p) divided by the probability of failure ($1-p$). In proportional odds model, the outcome variable is ordered with multiple levels, and the odds of being at or below a particular category ($Y \leq m$). The odds of being at or below a category in Ordinary likelihood Ratio (OLR) equals the probability of being at or below a category divided by the probability of being above that category:

$$Odds(Y \leq m) = \frac{\Pr(Y \leq m)}{\Pr(Y > m)}. \quad (3.8)$$

Since the probability of being at or below a category and the probability of being above that category is complementary, $\Pr(Y \leq m) + \Pr(Y > m) = 1$. This equation (3.8) can be rewritten as:

$$Odds(Y \leq m) = \frac{\Pr(Y \leq m)}{1 - \Pr(Y \leq m)}. \quad (3.9)$$

It can be remarked that the odds of being at or below a category m in OLR equals the probability of being at or below a category divided by its complementary probability, 1 minus the probability of being at or below that category. The probability of being at or below a category $\Pr(Y \leq m)$ is the cumulative probability since it equals the sum of the probabilities of all categories at or below that category:

$$\Pr(Y \leq m) = \Pr(Y = 1) + \Pr(Y = 2) + \dots + \Pr(Y = m) \quad (3.10)$$

when $m = 1, 2, \dots, M$.

The odds of being at or below a category in OLR are also called the cumulative odds. The cumulative odds in OLR are basically comparisons between two complementary probabilities (Xu and Long, 2005). The odds ratio in OLR is the change in the odds (i.e., the odds of being above a particular category versus being at or below that category) for a one-unit increase from any value of x to the value of $(x + 1)$, and it is an exponentiated logit coefficient, $\exp(\beta)$. In contrast, the odds of being at or below a particular category is the inverse of the odds of being above that category. It is the exponentiated logit coefficient with a negative sign before that (i.e., $\exp(-\beta)$).

3.7.3 Wald Test

The Wald statistic can be used to assess the contribution of individual predictors or the significance of individual coefficients in a given model. The formula for computing the Wald statistic is

$$W = \frac{\hat{\beta}_i}{SE(\hat{\beta}_i)} \quad (3.11)$$

where $\hat{\beta}_i$ is the estimate of the coefficient of the independent variable X_i and $SE(\hat{\beta}_i)$ is the standard error of $\hat{\beta}_i$. The Wald statistic is chi-square distributed with 1 degree of freedom. The null hypothesis is rejected if the p-value of the test is less than α significant level and it implies that the variable is important in the model.

Hypothesis tests for logit and probit models are based on Wald statistic, (Alison, P.D.1999). For an individual coefficient, to test the hypothesis: $H_o: \beta_j = \beta_j^{(0)}$, the Wald statistic should be calculated as

$$Z_0 = \frac{\beta_j - \beta_j^{(0)}}{SE(\beta_j)} \quad (3.12)$$

where $SE(\beta_j)$: the asymptotic standard error of β_j .

Z_0 follows an asymptotic unit-normal distribution under the null hypothesis.

3.8 Assessment of the Fitted Binary Logistics Regression Model

3.8.1 Likelihood Ratio Test

Likelihood Ratio (LR) uses maximum likelihood estimation to compute the coefficients for the LR equation. The method of maximum likelihood estimation chooses values for parameter estimators (regression coefficients) which make the observed data —maximally likely. Standard errors are obtained as a by-product of the maximization process. The goal of logistic regression is to estimate the $(K + 1)$ unknown parameters in the following equation.

$$P(Y) = \frac{\exp(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik})}{1 + \exp(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik})} \quad (3.13)$$

3.8.2 Omnibus Tests

Omnibus tests are a kind of statistical test. It is needed to test whether the explained variance in a set of data is significantly greater than the unexplained variance, overall. In addition, Omnibus test as a general name refers to an overall or a global test. Other names include F-test or Chi-Squared test. Omnibus test as a statistical test is implemented on an overall hypothesis that regarding coefficients $\beta_1 = \beta_2 = \dots = \beta_k = 0$ vs. at least one is not equal to zero in multiple linear regression or in logistic regression. Usually, it tests more than two parameters of the same type and its role is to find general significance of at least one of the parameters involved.

3.8.3 Hosmer-Lemeshow Test

The goodness of fit or calibration of a model describes how efficiently the model explains the response variable. Assessing goodness of fit involves exploration of how close the predicted values of the model are to the observed values. The Hosmer- Lemeshow test helps to analyze the similarity of the observed proportions of event to the predicted probabilities of occurrence in sub-groups of the model.

The Hosmer-Lemeshow test is analogous to χ^2 goodness of fit test and moreover this test has an advantage of partitioning the observations into approximately equal sized groups, and therefore they are less likely to be grouped with low observed and expected frequencies. For assessing, the Hosmer-Lemeshow, the predicted probabilities were transformed into deciles and then a Pearson χ^2 will be calculated that contrast the predicted to the observed frequencies in a 2-by-10 contingency table.

The values of the test statistics is given as

$$H = \sum_{g=1}^{10} \frac{(O_g - E_g)^2}{E_g} \quad (3.14)$$

where, O_g and E_g denote the observed events and expected events for the g^{th} risk deciles groups, respectively. Small values (with large value closer to 1, $p > 0.05$) indicate a good fit of the model, while large values ($p < 0.05$) indicate a poor model fit.

3.8.4 Cox and Snell R-Square

Cox and Snell's R-Square as a transformation of the statistic of $-2 \ln [L(M_{Intercept}) / L(M_{Full})]$ is used to determine the convergence of a logistic regression. The ratio of the likelihoods reflects the improvement of the full over the intercept model (the smaller the ratio, the greater the improvement). The Cox and Snell R-Square is

$$R^2 = 1 - \left[\frac{L(M_{Intercept})}{L(M_{Full})} \right]^{2/N} \quad (3.15)$$

$L(M)$ is the conditional probability of the dependent variable given the independent variables. If there are N observations in the dataset, then $L(M)$ is the product of N such probabilities. Thus, taking the n^{th} root of the product $L(M)$ provides an estimate of the likelihood of each Y value. Cox and Snell's pseudo R-squared has a maximum value that is not 1. If the full model predicts the outcome perfectly and has a likelihood of 1, Cox and Snell's R-Square will be $(1 - L(M_{Intercept})^{2/N})$, which is less than one.

3.8.5 Nagelkerke R- Square

It adjusts Cox & Snell's so that the range of possible values extends to 1. To achieve this, the Cox & Snell R-squared is divided by its maximum possible value, $1 - L(M_{Intercept})^{2/N}$.

The Nagelkerke R-Square is

$$R^2 = \frac{\left[\frac{L(M_{Intercept})}{L(M_{Full})} \right]^{\frac{2}{N}}}{1 - L(M_{Intercept})^{\frac{2}{N}}} \quad (3.16)$$

Then, if the full model perfectly predicts the outcome and has a likelihood of 1 and R-squared is equal to 1.

3.9 Description of Variables

In this study, the dependent variable was being active of PA of respondent, and the eight independent variables were age, gender, education, income of parents, parents tell PA's benefits, allow doing PA at friend's home, having same age friend and access safe space for doing PA outside.

Being Active of PA: It is divided into two groups as Active of PA and no active of PA of respondent. Child who does PA for equal to 60 minutes or more than 60 minutes is active PA. But a child who doesn't do PA for less than 60 minutes is no active PA.

Age: The age range of sample group in this study is from 6 years to 12 years.

Gender: The sex of respondents.

Education: The range of education of respondents is not studying in the school, studying in primary and middle education in the school.

Income of parents: The amount of income for one month of children's parents was collected.

Parents tell PA's benefits: The parents of study group tell their child to be aware of the benefits of doing physical activity.

Parents Allow doing PA at friend's home: The parents of study group allow their child to do PA at friend's home.

Having same age friend: The children have same age friend to do physical activity.

Access safe space for doing PA outside: Children could access safe space for doing PA outside.

The description of variables is described in Table (3.1).

Table (3.1) Study Variables

Dependent Variable	Definition	Code
Child Active physical activity (PA)	Child who does PA for equal to 60 minutes or more than 60 minutes is active PA. But a child who doesn't do PA for less than 60 minutes is no active PA.	1 = active of PA 0 = no active of PA
Independent Variables	Definition	Code
Age	Years	(Continuous)
Gender	Girl, Boy	1 = Girl 2 = Boy
Education	No education who are not studying in the school. Primary who are studying in the primary school. Middle who are studying in middle school.	1 = No education 2 = Primary education 3 = Middle education
Income of parents (monthly)	Income of children's parents collected the amount of income for one month.	1 = Under 300000 2 = 300000-399999 3 = 400000-499999 4 = 500000-599999
Parents tell PA's benefit	The parents of study group tell their child to be aware of the benefits of doing physical activity.	1 = never 2 = rarely 3 = sometimes 4 = often 5 = always
Parents allow children to play at friends' home	Parents allow their children to play at friends' home.	1 = never 2 = rarely 3 = sometimes 4 = often 5 = always
Children have same age friends	Child who has same age friend for doing PA.	1 = no 2 = yes
Children access safe space for doing PA outside	Children could access safe space for doing PA outside.	1 = never 2 = rarely 3 = sometimes 4 = often 5 = always

Source: Survey Data (2020)

3.10 Binary Logistics Regression Model of Being Active of PA

In this study, Being Active of PA is considered as dependent variable where active is 1 and no active is 0. Age, gender, education, income of parents, parents tell PA's benefits, allow doing PA at friend's home, having same age friend and access safe space for doing PA outside are also considered as the independent variables.

The binary logistic regression model can be written as;

$$\log[\pi(X)] = \log \left[\frac{\pi_i}{1 - \pi_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$

Where, Y_i = Children Active Physical Activity

= 1, if respondent active physical activity

= 0, if respondent doesn't active physical activity

β_0 = Constant

β_i = Coefficients of the independent variables

X_{1i} = Age

X_{2i} = Education

= 1 if no education

= 2 if primary education

= 3 if middle education

X_{3i} = Gender

= 1 if girl

= 2 if boy

X_{4i} = Income of parents (monthly)

= 1 if under 300000

= 2 if 300000-399999

= 3 if 400000-499999

= 4 if 500000-599999

X_{5i} = Parent tells benefits of PA

= 1 if never

= 2 if rarely

= 3 if sometime

= 4 if often

= 5 if always

X_{6i} = Parents allow doing PA at friend's home

= 1 if never

= 2 if rarely

= 3 if sometime

= 4 if often

= 5 if always

X_{7i} = Children have same age friend

= 1 if no

= 2 if yes

X_{8i} = Children access safe space for doing PA outside

= 1 if never

= 2 if rarely

= 3 if sometime

= 4 if often

= 5 if always

CHAPTER IV

DATA ANALYSIS AND RESULTS

The purpose of this chapter is to analyze the influencing factors of child activities in Ward (32), North Dagon Township, Yangon Region. The Descriptive Statistics was used to present the demographic and socioeconomic characteristics of children and PA characteristics of children. Chi-Square test was applied to present the association between children active PA and Independent variables. Binary Logistic Regression Model was used to analyze the factors associated with PA participation among children.

4.1 Descriptive Statistics

The descriptive statistics is carried out to describe the being active of PA and some demographic and socioeconomic variables of respondent such as age, gender, education, income of parents, parents tell PA's benefits, parents allow doing PA at friend's home, children have same age friend and children access safe space for doing PA outside.

Table (4.1) Distribution for being Active of PA

Types of PA	Number	Percent
Active	158	76.3
No active	49	23.7
Total	207	100.0

Source: Survey Data (2020)

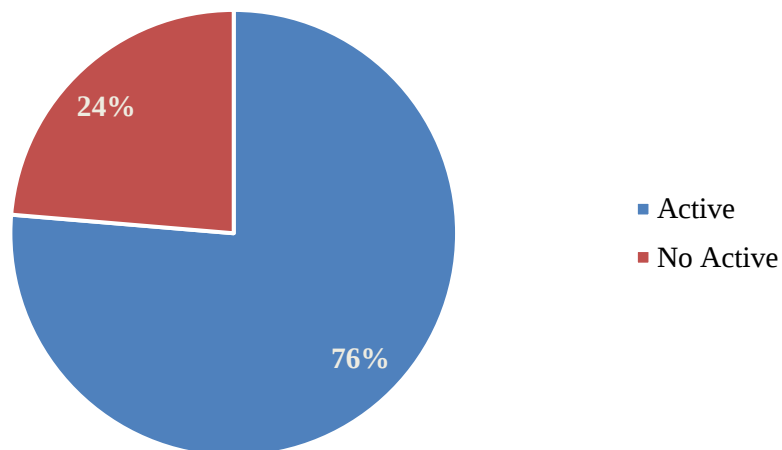


Figure (4.1) Distribution of being Active PA

According to Table (4.1) and figure (4.1), there are 76.3% (158) of children active PA since their spending times for doing PA is equal to or more than 60 minutes in a day, and there are 23.7% (49) of children don't active PA because their spending times for physical activities is less than 60 minutes in a day. Active PA of respondent is more than non-active PA. Almost one-fourth of total children are not active PA.

4.2 Demographic, Socioeconomic and PA Characteristics of Respondents

The information on demographic and socioeconomic characteristics of respondents included in the study is described in Table (4.2) and Table (4.3). The demographic and socioeconomic characteristics are sex, age, education, parents tell PA's benefits, allow doing PA at friend's home, having same age friend, parent allows doing PA outside and access safe space for doing PA outside of respondents.

Table (4.2) Demographic and Socioeconomic Characteristics of Respondents

Variable	Numbers of Respondent	Percent (%)
Gender		
Girl	105	50.7
Boy	102	49.3
Age		
6	32	15.5
7	22	10.6
8	31	15
9	22	10.6
10	22	10.6
11	29	14
12	49	23.7
Education		
No education	23	11.1
Primary	82	39.6
Middle	102	49.3
Parent's Income (Monthly)		
Under 300000	53	25.6
300000-399999	26	12.6
400000-499999	44	21.3
500000-599999	84	40.6

Source: Survey Data (2020)

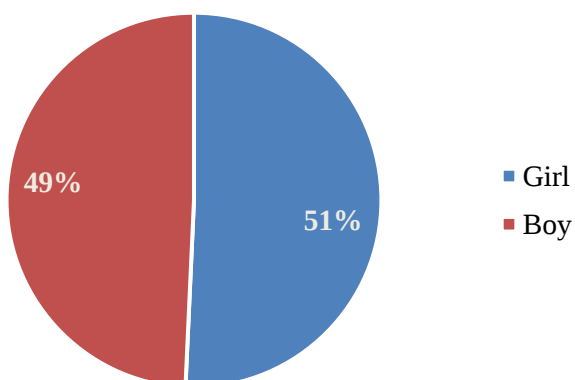


Figure (4.2) Distribution of Gender of Children

According to Table (4.2) and Figure (4.2), there are total of 207 children in this study. (49.3%) of children are boys and (50.7%) of children are girls. The ratio of gender balance in this study is almost equal.

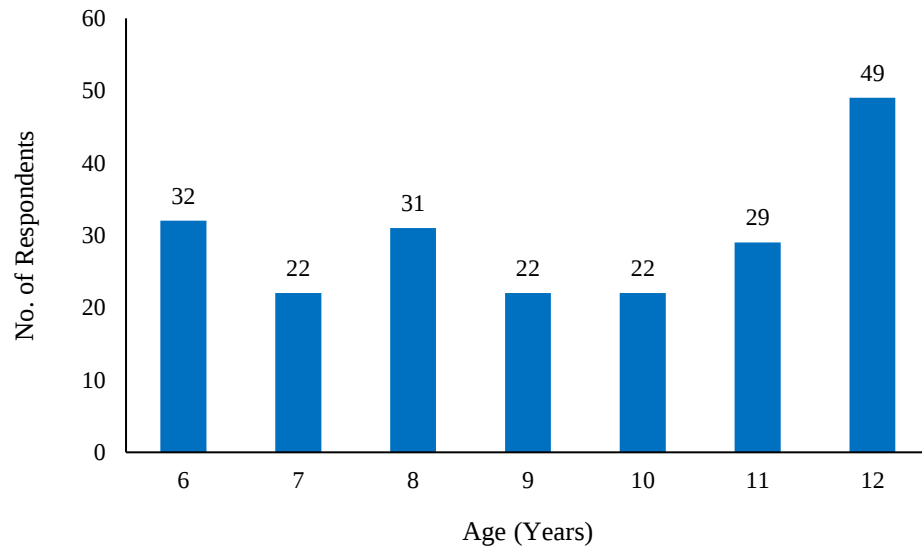


Figure (4.3) Distribution of Age of Children

According to Table (4.3) and Figure (4.3), the age range of children is from 6 years to 12 years. The most children are aged of 12 years old (49). The least children are aged 7,9,10 years old and each of their numbers are 22.

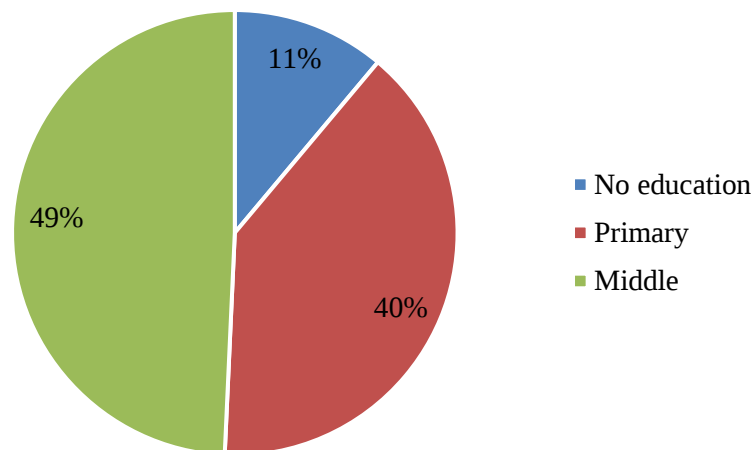


Figure (4.4) Distribution of Education of Children

According to Table (4.4) and Figure (4.4), the education levels of children are not studying in the school, studying in the primary education and middle education. 23 (11.1%) of children are not studying in school. 82 (39.6%) of children are studying in primary education and 102 (49.3%) of children are studying in middle education. In this study found that the most children are studying in school.

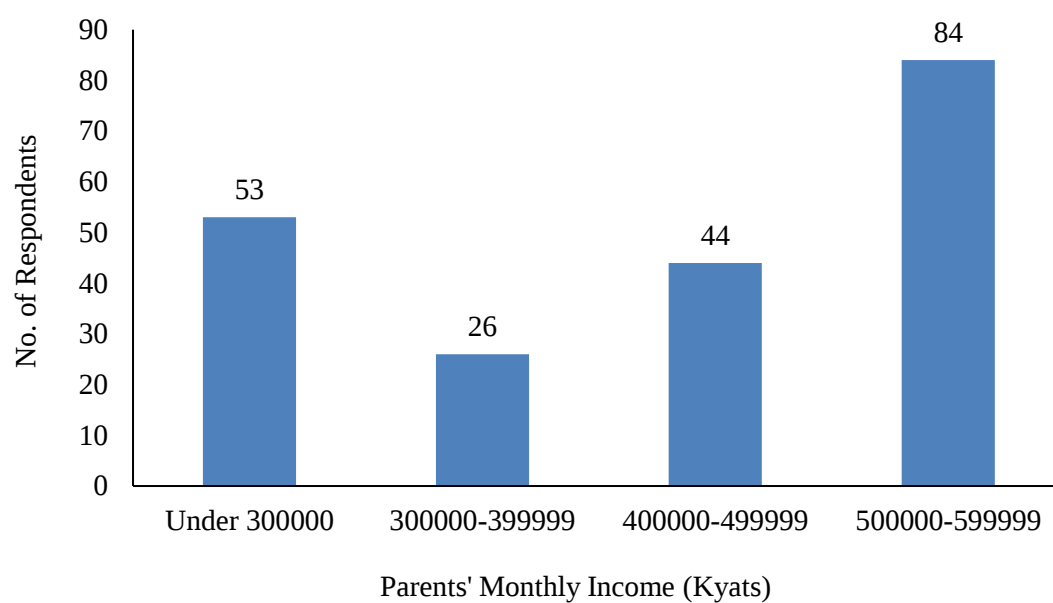


Figure (4.5) Distribution of Parent's Income

According to Table (4.2) and Figure (4.5), the range of income of children's parents is from under 300000MMK to 599999MMK per month. The majority of parents have income between 500000-599999MMK per month. The minority of parents have income between 300000-399999MMK per month. It indicates that almost half of children's parents have enough income to cover only their basic needs.

Table (4.3) PA Characteristics of Respondents

Variable	Numbers of Respondent	Percent (%)
Parents tell PA's benefits		
Never	108	52.2
Rarely	54	26.1
Sometime	22	10.6
Often	23	11.1
Always	0	0
Parents allow playing at friend's home		
Never	22	10.6
Rarely	22	10.6
Sometime	38	18.4
Often	103	49.8
Always	22	10.6
Children have same age friend		
Yes	184	88.9
No	23	11.1
Children access safe space for doing PA outside		
Never	22	10.6
Rarely	22	10.6
Sometime	47	22.7
Often	116	56.0
Total	207	100

Source: Survey Data (2020)

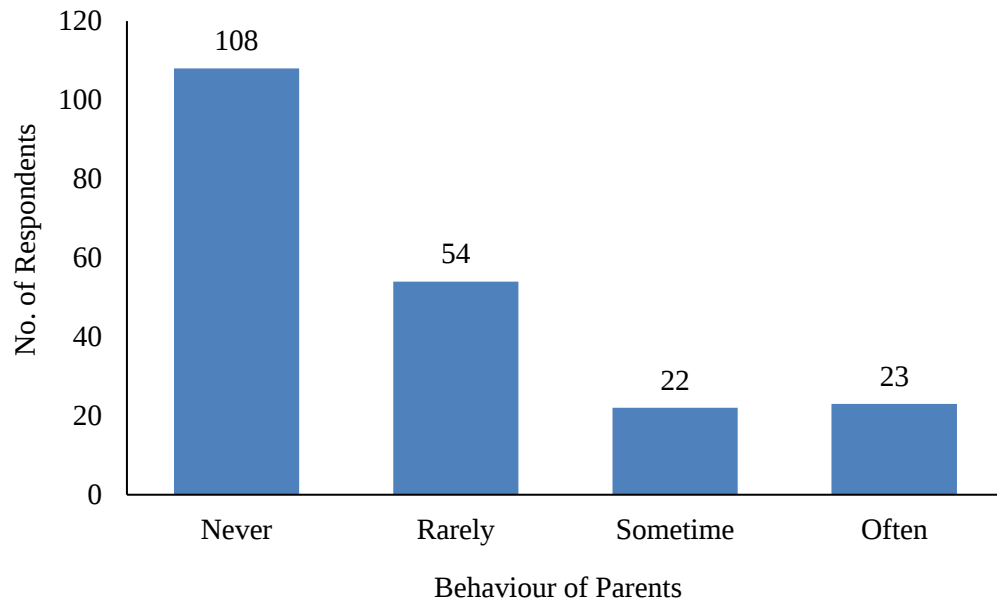


Figure (4.6) Parents Tell PA's Benefits

According to the Table (4.3) and Figure (4.6), the distribution of answer of respondent to parent tells PA's benefits is never 108 (52.2%), rarely 54 (26.1%), sometimes 22(10.6%) and often 23 (11.1%).The bar chart shows that 52.2% of children were never told the PA's benefits by their parent, and only 11.1% of children are often told the PA's benefits by their parent. It could conclude that most children are never told PA benefits by their parents.

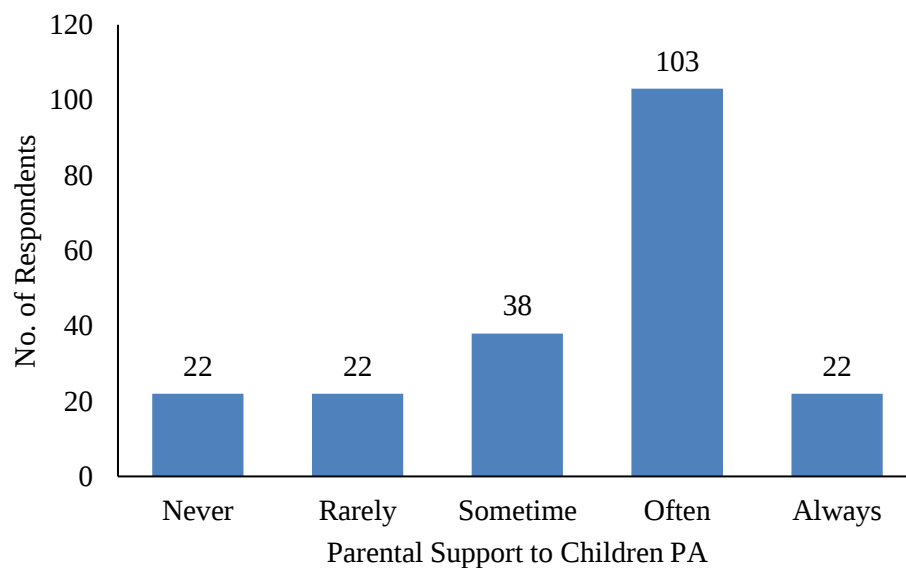


Figure (4.7) Parents Allow Playing at Friend's Home

According to Table (4.3) and Figure (4.7), the respondents answered to parents allowing playing at friend's home is never 22 (10.6%), rarely 22 (10.6%), sometimes 38 (18.4%), often 103 (49.8%) and always 22 (10.6%). The bar chart describes that most children responded that they are often allowed to do PA at friend's home since the percentage of often (49.8%) is largest compared to the rest of Likert scale. There are only 22 children are allowed to do PA at friend's home. On the other hand, it is indicating that probably parents may not have good social skill or level with parents of their children to allow their child to do PA at friend's home.

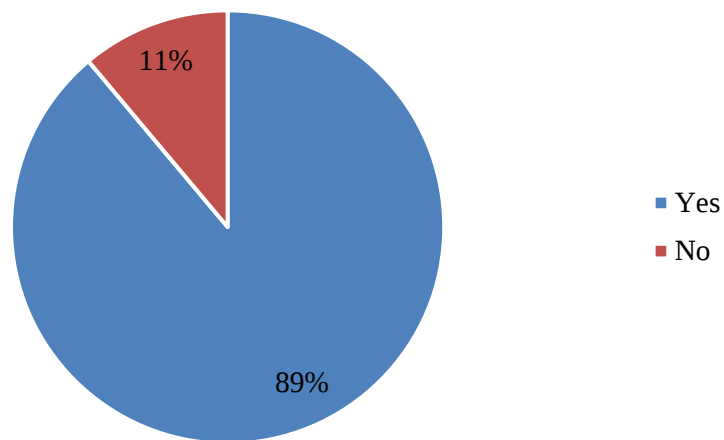


Figure (4.8) Children have same Age Friend to do PA

According to Table (4.3) and Figure (4.8), the result of children responding to the question of having same age friend is 184 (88.9%) yes and 23 (11.1%) no. It could conclude that the most children have same age friend for doing PA since 88.9% of respondents answered “yes” for question of same age friend.

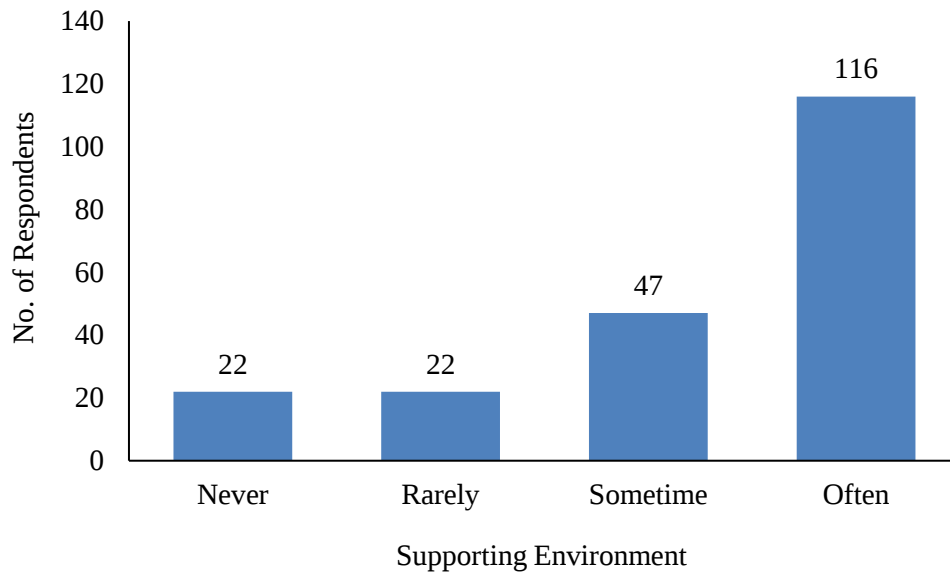


Figure (4.9) Children Access Safe Space for Doing PA Outside

According to Table (4.3) and Figure (4.9), the result of respondents answered to the access safe space for doing PA outside is never 22(10.6%), rarely 22 (10.6%), sometimes 47 (22.7%) and often 116 (56.0%). The most children answered that they could often access the safe space for doing PA outside, and its percentage is 56.0%. It could conclude that there is a specific space of doing PA around their living area or people who are living in those area may be aware of giving a safe space of doing PA outside for children.

4.3 Association between PA and Independent Variables

The association of dependent variable of children active PA and independent variables such as the age and education of children, income of children's parent, parents tell PA's benefit, parents allow doing PA at friend's home, having same age friend and children access safe space for doing PA outside are showed in Table (4.4).

Table (4.4) Association between being Active of PA and Independent Variables

Variable	Being Active of PA		Chi-square	P-value
	Active	No Active		
Age				
6	20	12	28.664***	0.000
7	11	11		
8	27	4		
9	13	9		
10	16	6		
11	24	5		
12	47	2		
Education				
No Education	4	19	49.973***	0.000
Primary Education	70	12		
Middle Education	84	18		
Parent's Income (Monthly)				
Under 300000	38	15	1.190**	0.003
300000-399999	21	5		
400000-499999	33	11		
500000-599999	66	18		
Parents tell PA's Benefit				
Never	93	15	15.044**	0.002
Rarely	39	15		
Sometime	12	10		
Often	14	9		
Parents allow doing PA at friend's home				
Never	5	17	96.203***	0.000
Rarely	6	16		
Sometime	31	7		
Often	102	1		
Always	14	8		
Children have same age friends				
Yes	153	31	42.676***	0.000
No	5	18		
Parent allows doing PA at outside				
Never	3	19	86.818***	0.000
Rarely	9	13		
Sometime	50	8		
Often	79	2		
Always	17	7		
Children Access safe space for doing PA outside				
Never	6	16	83.501***	0.000
Rarely	5	17		
Sometime	39	8		
Often	108	8		

Source: Survey Data (2020)

***denotes significant at 1% level, **denotes significant at 5% level and * denotes significant at 10% level

Chi-square test in Table (4.4) shows that association between children active PA and independent variables. Children's age, education and income of children's parents are statistically significant at 1% level. Moreover, parents tell PA's benefits and parent allows doing PA at friend's home are statistically significant at 1% level. The independent variable of having same age friend is statistically significant at 1% level. Children access safe space for doing PA outside are statistically significant at 1% level. All independents of child active PA are statistically significant at 1% level.

4.4 Results of Binary Logistic Regression Model

In this study, children active PA is considered as dependent variable and the children who spend their equal or more than 60 minutes for doing PA is 1, otherwise, 0 is children who spend their time of doing PA less than 60 minutes. Age and education of respondent, income of children's parents, parents tell PA's benefit, parent allow to do PA at friend's home, children have same age friend and children access safe space for doing PA outside are also considered as the independent variables. These seven factors affected on being active of PA in North Dagon Township are examined by using binary logistic regression model.

The overall model fitting information for binary logistic regression model is given in Table (4.5).

Table (4.5) Overall Model Fitting

Criteria	Chi Square Value	DF	P-vale
Omnibus	179.442	17	0.000
Hosmer and Lemeshow	2.758	8	0.949
-2Log Likelihood	47.125		
Cox & Snell R Squares	0.580		
Nagekerke	0.871		
Overall Correct Prediction	95.7		

Source: Survey Data (2020)

In Omnibus test of model coefficient, the inclusion of seven explanatory variables yield a chi-square value of 179.442 with 17 degree of freedom, $p = 0.000$. Therefore, the overall model is statistically significant, which means that adding the

seven explanatory variables to the model have significantly increased ability to predict whether the factors influenced on being active of PA for a children.

The measure of model fit the Hosmer and Lemeshow test, which measures the correspondence of the actual and predicted values of the dependent variable. The better model fit is included by a smaller difference in the observed and predicted classification. Hosmer-Lemeshow test statistic gives χ^2 value (2.758) with p-value (0.949) and revealed that the test is no significant. Therefore, it can conclude that the fitted model is good.

The -2 log likelihood statistics is (47.125). Table (4.5) provides some approximation of R^2 statistics in logistic regression. Cox and Snell's R^2 attempts to imitate multiple R^2 based on likelihood. The result of Cox and Snell's R^2 and the Nagelkerke R^2 are (0.580) and (0.871) which indicate a reasonable fit of the model to the data. This shows that (58 %) of the variation and (87.1%) of variation in child active PA are explained by the model. The overall model evaluation is correctly predicted to be about (95.7%).

The results of binary logistic regression model for children active PA in Ward (32), North Dagon Township are described in Table (4.6).

Table (4.6) Binary Logistic Regression Model of Being Active of Physical Activity

Variables	B	S.E	Wald	DF	Sig.	Exp(B)	95% C.I for Exp (B)	
							Lower	Upper
Intercept	-20.313	6.872	8.738	1	0.003	0.000		
Age	1.284***	0.477	7.234	1	0.007	3.611	1.417	9.204
Education								
No Education	-0.494	2.286	0.047	1	0.829	0.610	0.007	53.872
Primary Education	8.142***	2.841	8.211	1	0.004	34.379	13.103	88.273
Middle Education (ref)								
Parent's Income (Monthly)								
Under 300000	1.084	1.303	0.692	1	0.405	2.955	0.230	37.963
300000-399999	4.752**	2.009	5.593	1	0.018	5.845	2.257	46.724
400000-499999	-1.217	1.103	1.216	1	0.270	0.296	0.034	2.575
500000-599999 (ref)								
Parents tell PA's Benefit								
Never	2.900**	1.431	4.109	1	0.043	18.168	1.101	99.902
Rarely	2.394	1.532	2.442	1	0.118	10.954	0.544	20.542
Sometime	0.128	1.381	0.009	1	0.926	1.137	0.076	17.043
Often (ref)								
Parents Allow doing at friend's home								
Never	1.703	1.594	1.141	1	0.285	5.490	0.241	124.828
Rarely	1.957	1.672	1.371	1	0.242	7.077	0.267	187.350
Sometime	0.712	1.479	0.232	1	0.630	2.038	0.112	36.999
Often	5.792**	2.313	6.273	1	0.012	7.753	3.523	88.217
Always (ref)								
Children have same age friend								
Yes	5.949***	2.163	7.566	1	0.006	3.554	1.530	55.719
No (ref)								
Children access Safe Space								
Never	-7.096***	2.108	11.335	1	0.001	0.001	0.0001	0.052
Rarely	-4.675***	1.797	6.766	1	0.009	0.009	0.0003	0.316
Sometime	0.359	1.305	0.076	1	0.783	1.431	1.111	18.479
Often (ref)								

Note: ***, **, * represent 1%, 5% and 10% level of significance

Source: Survey Data (2020)

The Table (4.6) shows that the age of children is a significant variable on Children Active PA at 1% level. In terms of a child's age for doing PA, the age of the child has a positive influence on children active PA. The effect could be lower level 1.417 and upper level 9.204 at 95% confidence interval. It could conclude that the children who are in older age are about 3.61 times more likely to do active PA than children who are in younger age.

To examine the association of children's education level on children active PA, there are three group of education levels, no education, primary education and middle education. Middle education was considered to be ref since the education curriculum of primary and middle is different. The curriculum of primary education is based on the approach of learning through playing. The education level of children who are primary education level at who are middle education level is a significant variable on children active PA at 1% level. It is positively influencing on the children active PA. Its effect is lower level 13.103 and upper level 88.273 at 95% of confidence interval. The children who are studying in the primary education are about 34.38 times more likely to do active PA than children who are studying in the middle education.

The one-month amount of income of children's parents is a significant variable on the children active PA. Moreover, it has a positive influence on the outcome variable of children active PA. This independent variable of one-month amount of income of children's parents is statistically significant at 5% level. Its effect could be lower level 2.257 and upper level 46.724 at 95% confidence interval. It found that parents income amount is 300000-399999MMK are about 5.85 times more likely to do active PA than parents' income is 500000-599999MMK. It could conclude that the children from low income amount of parents are more active in doing PA.

Parents tell PA's Benefit (never) of children is significant variable on children active PA at Parents tell PA's Benefit (often) at 5% level. With regards to parents tell PA's benefits, it has a positive impact on child active PA. It is statistically significant at 5% level. The magnitude of the effect is between the lower limit 1.101 and upper limit 99.902 at confidence interval of 95%. Children who are never told PA's benefits by their parents are about 18.17 times more likely to do active PA than children who are always told PA's benefits by their parents.

Parents allowing doing at friend's home (never) of children is significant variable on children active PA at Parents allowing doing at friend's home (ever) at 1% level. Concerning the parent allows doing PA at friend's home, it has positive influence on the children active PA. The effect is found to be statistically significant at 1%. Its magnitude effect is from 3.523 to 88.217. Children who are allowed to do PA at friend's home by their parents are about 7.75 times more likely to do active PA than children who are always allowed to do PA at friend's home by their parents.

Having same age friend (Yes) of children is significant variable on children active PA of having same age friend (No) at 1% level. As for other factor of having same age friend has positive influence on the children active PA. It is statistically significant at 1%. The effect could be lower level 1.530 and upper level 55.719. The children who have same age friend are about 3.55 times more likely to do active PA than children who don't have same age friend.

The independent variable of access safe space for doing PA outside (never) of children is significant variable on children active PA at access safe space for doing PA outside (often) at 1% level. Moreover, the variable of access safe space for doing PA outside (rarely) of respondent is significant variable on children active PA at access safe space for doing PA outside (often) at 1% level. They influence negatively on the child active PA of outcome variable. Their effect could be between lower level 0.000 and upper level 0.316. The children who never access safe space for doing PA outside are about 0.98 times less likely to do active PA than children who often access safe space. The children who rarely access safe space are about 0.99 less likely to do active PA than children who often access safe space.

CHAPTER VI

CONCLUSION

This chapter includes the findings and discussion of the study, suggestions, and further studies.

5.1 Findings and Discussions

This study uses primary data of children who are living in Ward (32), North Dagon Township, Yangon. The survey covered 207 children from the age of 6 years to 12 years. Descriptive statistics are performed to explain the situation of demographics, socioeconomics, and PA characteristics of children. It found that many children are active in doing PA. The participation of boys and girls in this study is almost balanced. According to the age, the most children in this study are 12 years old. The most children are studying in the school. The most children of their parents have enough income amount for their basic needs. Most children are not told the PA's benefits by their parents. Most children are often allowed to play at their friend's home. Most children have same age friend to do PA. Most children often access a safe space for doing PA outside.

Chi-square test was used to explain the association between children active PA and independent variables. As the result, children age, education and monthly income amount of parents, parents tell PA's benefits, parents allow doing PA at friend's home, children have same age friend, parents allow doing PA outside, children access a safe space for doing PA outside are statistically significant at 1% level. It was found that there is association between children active PA and independent variables.

For overall model fitting for Binary Logistic Regression, the Hosmer and Lemeshow was tested that the test is not significant. Therefore, it can conclude that the fitted model is good. The -2 log likelihood statistics 47.125 and Cox and Snell's R^2 , that (58%) of the variation and (87.1 %) of variation in child active PA are explained by the model. The overall model evaluation is correctly predicted to be about (95.7%).

Binary Logistic Regression was used to analyze the factors associated with PA participation among children. The result shows that there are seven independent

variables are influencing the dependent variable of children active PA. The age of children has a positive influence on children active PA. The education (middle) of children also positively influences children active PA. The monthly income amount of parents has positively influence on children active PA. Parents tell PA's benefits (never) positively influence children active PA. Parents allow doing at friend's home (never) has positive influence on children active PA. Moreover, children have same age friend (yes) positively influence children active PA. Children access a safe space for doing PA outside has positive influence on children active PA.

5.2 Suggestions

The age of child influences positively on child active PA that indicates the children getting more older and older, they could more participate in child active PA. It is simply that the development of bone and skeleton structure are stronger when they are getting old. So, the children who are older age could rather be active in PA compared to the younger age of their child life.

The education level of children on the dependent variable of child active PA has positive influence on the child active PA. It said that children who are in primary level of education do more physical activities than children who are studying in middle level education. According to the education curriculum, the teaching approach to primary level is learning through playing. So, the result of the study supports that the primary level of teaching approach supports the level of children being active PA.

The income amount of parents' income has positive influence on child active PA. Children whose parents' income is 300000-399999MMK are more active PA than the children whose parents' income is 500000-599999MMK. Therefore, the children whose parents have a middle level of income amount do more physical activity. On the other hand, it explains that the children whose parents have high income may invest for their child education through giving opportunity of studying more in tuition after school time that children whose parents could not afford. Therefore, children whose parents have low income could do more physical activity in their free time compared to the children whose parents have high income.

The independent variable of parents tells PA's benefits (Never) has positive influence on the children active PA although it was supposed to be positive influencing. To reflect on the nature of parents telling PA's benefits to the children, generally parents tell their children "do" and "don't" when their children do PA activities instead of telling the real benefits of physical activities. Mostly they say that if you climb on the high, you will fall down or get dangerous instead of saying how to make safe climbing for their children more active in the PA. It is obvious that there should be awareness activities to the parents to promote their children active in the PA by telling the benefits of PA and ways of doing PA safely rather than sharing obligations to their children.

The variable of parents allow children to do PA at friend's home (often) is positively influencing on child active PA. Therefore, the children are allowed doing PA at friend's home (often) are more active PA than children who are always allowed to do PA at friend's home. If parents have a good and close relationship with their children's parents, they are willing to allow their children to play at their friend's home. Nowadays, most children are very active in using phones, or tablet or computer or TV. If their parents have a good relationship and allow their children's friends in home, it is likely to allow their children to be allowed to watch movies in the mobile devices. That is the way of controlling the children to be quiet in the home. It could assume that children, who are always to do PA at friend's home, possibly spend more for screen time rather than doing PA.

Children who have friends of their same age have positively influenced the children active PA. It is obvious that a child who has more friends of their same age will do more physical activity actively. The most children are spending their time in the school, playground, sport club and park or any areas where children can play safely. So, parents should enroll their children in the school and transport them to the where the most children can spend their time doing PA.

Children can access a safe space (never and rarely) have negative influence on the child active PA. It is true that no children can active their PA level without having safe space of doing PA. It simply suggests that parents or any other power holders should consider creating more safe space of doing PA for children since the active level of child PA contributes a lot to all levels of child's development and their well-being.

5.3 Further Studies

This study is only based on Ward (32) in North Dagon township, Yangon. Similar or better research should be conducted to study more about what other factors are influencing the children active PA since the level of child active PA is associated with level of child development in their early life cycle. Not only in the ward, but also across the country should be conducted the research of examining the influencing factors on the child active PA.

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APPENDIXES

Appendix (A)

Table (A-1) Cross test of being active of PA and Age of respondents

		Active of PA		Total
		No active	Active	
age of respondent	Count	12	20	32
	Expected Count	7.6	24.4	32.0
	6.00 % within age of respondent	37.5%	62.5%	100.0%
	% within Active of PA	24.5%	12.7%	15.5%
	% of Total	5.8%	9.7%	15.5%
	Count	11	11	22
	Expected Count	5.2	16.8	22.0
	7.00 % within age of respondent	50.0%	50.0%	100.0%
	% within Active of PA	22.4%	7.0%	10.6%
	% of Total	5.3%	5.3%	10.6%
	Count	4	27	31
	Expected Count	7.3	23.7	31.0
	8.00 % within age of respondent	12.9%	87.1%	100.0%
	% within Active of PA	8.2%	17.1%	15.0%
	% of Total	1.9%	13.0%	15.0%
	Count	9	13	22
	Expected Count	5.2	16.8	22.0
	9.00 % within age of respondent	40.9%	59.1%	100.0%
	% within Active of PA	18.4%	8.2%	10.6%
	% of Total	4.3%	6.3%	10.6%
	Count	6	16	22
	Expected Count	5.2	16.8	22.0
	10.00 % within age of respondent	27.3%	72.7%	100.0%
	% within Active of PA	12.2%	10.1%	10.6%
	% of Total	2.9%	7.7%	10.6%
	Count	5	24	29
	Expected Count	6.9	22.1	29.0
	11.00 % within age of respondent	17.2%	82.8%	100.0%
	% within Active of PA	10.2%	15.2%	14.0%
	% of Total	2.4%	11.6%	14.0%
	Count	2	47	49
	Expected Count	11.6	37.4	49.0
	12.00 % within age of respondent	4.1%	95.9%	100.0%
	% within Active of PA	4.1%	29.7%	23.7%
	% of Total	1.0%	22.7%	23.7%
Total	Count	49	158	207
	Expected Count	49.0	158.0	207.0
	% within age of respondent	23.7%	76.3%	100.0%
	% within Active of PA	100.0%	100.0%	100.0%
	% of Total	23.7%	76.3%	100.0%

Table (A-2) Cross test of being active of PA and Education of respondents

			Active of PA		Total
			No active	Active	
education of respondent	No education	Count	19	4	23
		Expected Count	5.4	17.6	23.0
		% within education of respondent	82.6%	17.4%	100.0%
		% within Active of PA	38.8%	2.5%	11.1%
		% of Total	9.2%	1.9%	11.1%
	Primary	Count	12	70	82
		Expected Count	19.4	62.6	82.0
		% within education of respondent	14.6%	85.4%	100.0%
		% within Active of PA	24.5%	44.3%	39.6%
		% of Total	5.8%	33.8%	39.6%
	Middle	Count	18	84	102
		Expected Count	24.1	77.9	102.0
		% within education of respondent	17.6%	82.4%	100.0%
		% within Active of PA	36.7%	53.2%	49.3%
		% of Total	8.7%	40.6%	49.3%
Total	Count	49	158	207	
	Expected Count	49.0	158.0	207.0	
	% within education of respondent	23.7%	76.3%	100.0%	
	% within Active of PA	100.0%	100.0%	100.0%	
	% of Total	23.7%	76.3%	100.0%	

Table (A-3) Cross test of being active of PA and parent tells PA's benefits

			Active of PA		Total
			No active	Active	
benefit	never	Count	15	93	108
		Expected Count	25.6	82.4	108.0
		% within benefit	13.9%	86.1%	100.0%
		% within Active of PA	30.6%	58.9%	52.2%
		% of Total	7.2%	44.9%	52.2%
	rarely	Count	15	39	54
		Expected Count	12.8	41.2	54.0
		% within benefit	27.8%	72.2%	100.0%
		% within Active of PA	30.6%	24.7%	26.1%
		% of Total	7.2%	18.8%	26.1%
	sometime	Count	10	12	22
		Expected Count	5.2	16.8	22.0
		% within benefit	45.5%	54.5%	100.0%
		% within Active of PA	20.4%	7.6%	10.6%
		% of Total	4.8%	5.8%	10.6%
	often	Count	9	14	23
		Expected Count	5.4	17.6	23.0
		% within benefit	39.1%	60.9%	100.0%
		% within Active of PA	18.4%	8.9%	11.1%
		% of Total	4.3%	6.8%	11.1%
Total		Count	49	158	207
		Expected Count	49.0	158.0	207.0
		% within benefit	23.7%	76.3%	100.0%
		% within Active of PA	100.0%	100.0%	100.0%
		% of Total	23.7%	76.3%	100.0%

Table (A-4) Cross test of being active of PA and parent allows doing PA outside

			Active of PA		Total
			No active	Active	
P doing	never	Count	19	3	22
		Expected Count	5.2	16.8	22.0
		% within P doing	86.4%	13.6%	100.0%
		% within Active of PA	38.8%	1.9%	10.6%
		% of Total	9.2%	1.4%	10.6%
	rarely	Count	13	9	22
		Expected Count	5.2	16.8	22.0
		% within P doing	59.1%	40.9%	100.0%
		% within Active of PA	26.5%	5.7%	10.6%
		% of Total	6.3%	4.3%	10.6%
	sometime	Count	8	50	58
		Expected Count	13.7	44.3	58.0
		% within P doing	13.8%	86.2%	100.0%
		% within Active of PA	16.3%	31.6%	28.0%
		% of Total	3.9%	24.2%	28.0%
	often	Count	2	79	81
		Expected Count	19.2	61.8	81.0
		% within P doing	2.5%	97.5%	100.0%
		% within Active of PA	4.1%	50.0%	39.1%
		% of Total	1.0%	38.2%	39.1%
	always	Count	7	17	24
		Expected Count	5.7	18.3	24.0
		% within P doing	29.2%	70.8%	100.0%
		% within Active of PA	14.3%	10.8%	11.6%
		% of Total	3.4%	8.2%	11.6%
Total		Count	49	158	207
		Expected Count	49.0	158.0	207.0
		% within P doing	23.7%	76.3%	100.0%
		% within Active of PA	100.0%	100.0%	100.0%
		% of Total	23.7%	76.3%	100.0%

Table (A-5) Cross test of being active of PA and having same age friend

			Active of PA		Total
			No active	Active	
same age F	Count		31	153	184
	Expected Count		43.6	140.4	184.0
	Yes	% within same age F	16.8%	83.2%	100.0%
		% within Active of PA	63.3%	96.8%	88.9%
		% of Total	15.0%	73.9%	88.9%
	Count		18	5	23
	Expected Count		5.4	17.6	23.0
	No	% within same age F	78.3%	21.7%	100.0%
		% within Active of PA	36.7%	3.2%	11.1%
		% of Total	8.7%	2.4%	11.1%
	Count		49	158	207
	Expected Count		49.0	158.0	207.0
Total		% within same age F	23.7%	76.3%	100.0%
		% within Active of PA	100.0%	100.0%	100.0%
		% of Total	23.7%	76.3%	100.0%

Table (A-6) Cross test of being active of PA and parent allows doing PA at friend's home

			Active of PA		Total
			No active	Active	
allows with F	never	Count	17	5	22
		Expected Count	5.2	16.8	22.0
		% within allows with F	77.3%	22.7%	100.0%
		% within Active of PA	34.7%	3.2%	10.6%
		% of Total	8.2%	2.4%	10.6%
	rarely	Count	16	6	22
		Expected Count	5.2	16.8	22.0
		% within allows with F	72.7%	27.3%	100.0%
		% within Active of PA	32.7%	3.8%	10.6%
		% of Total	7.7%	2.9%	10.6%
	sometime	Count	7	31	38
		Expected Count	9.0	29.0	38.0
		% within allows with F	18.4%	81.6%	100.0%
		% within Active of PA	14.3%	19.6%	18.4%
		% of Total	3.4%	15.0%	18.4%
	often	Count	1	102	103
		Expected Count	24.4	78.6	103.0
		% within allows with F	1.0%	99.0%	100.0%
		% within Active of PA	2.0%	64.6%	49.8%
		% of Total	0.5%	49.3%	49.8%
	always	Count	8	14	22
		Expected Count	5.2	16.8	22.0
		% within allows with F	36.4%	63.6%	100.0%
		% within Active of PA	16.3%	8.9%	10.6%
		% of Total	3.9%	6.8%	10.6%
Total	Count	49	158	207	
	Expected Count	49.0	158.0	207.0	
	% within allows with F	23.7%	76.3%	100.0%	
	% within Active of PA	100.0%	100.0%	100.0%	
	% of Total	23.7%	76.3%	100.0%	

Table (A-7) Cross test of being active of PA and access safe place

			Active of PA		Total
			No active	Active	
access safe place	never	Count	16	6	22
		Expected Count	5.2	16.8	22.0
		% within access safe place	72.7%	27.3%	100.0%
		% within Active of PA	32.7%	3.8%	10.6%
		% of Total	7.7%	2.9%	10.6%
	rarely	Count	17	5	22
		Expected Count	5.2	16.8	22.0
		% within access safe place	77.3%	22.7%	100.0%
		% within Active of PA	34.7%	3.2%	10.6%
		% of Total	8.2%	2.4%	10.6%
	sometime	Count	8	39	47
		Expected Count	11.1	35.9	47.0
		% within access safe place	17.0%	83.0%	100.0%
		% within Active of PA	16.3%	24.7%	22.7%
		% of Total	3.9%	18.8%	22.7%
	often	Count	8	108	116
		Expected Count	27.5	88.5	116.0
		% within access safe place	6.9%	93.1%	100.0%
		% within Active of PA	16.3%	68.4%	56.0%
		% of Total	3.9%	52.2%	56.0%
Total		Count	49	158	207
		Expected Count	49.0	158.0	207.0
		% within access safe place	23.7%	76.3%	100.0%
		% within Active of PA	100.0%	100.0%	100.0%
		% of Total	23.7%	76.3%	100.0%

Appendix (B)

Table (B-1) Chi-square test of being active of PA and Age of respondents

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.664 ^a	6	.000
Likelihood Ratio	30.964	6	.000
Linear-by-Linear Association	16.091	1	.000
N of Valid Cases	207		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.21.

Table (B-2) Chi-square test of being active of PA and Education of respondents

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	49.973 ^a	2	.000
Likelihood Ratio	41.975	2	.000
Linear-by-Linear Association	22.537	1	.000
N of Valid Cases	207		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.44.

Table (B-3) Chi-square test of being active of PA and benefit of respondents

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.044 ^a	3	.002
Likelihood Ratio	14.615	3	.002
Linear-by-Linear Association	12.977	1	.000
N of Valid Cases	207		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.21.

Table (B-4) Chi-square test of being active of PA and parent allows doing PA outside

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	86.818 ^a	4	.000
Likelihood Ratio	85.006	4	.000
Linear-by-Linear Association	51.234	1	.000
N of Valid Cases	207		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.21.

Table (B-5) Chi-square test of being active of PA and having same age friend

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	42.676 ^a	1	.000	.000	.000
Continuity Correction ^b	39.345	1	.000		
Likelihood Ratio	35.607	1	.000		
Fisher's Exact Test					
Linear-by-Linear Association	42.470	1	.000		
N of Valid Cases	207				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.44.

b. Computed only for a 2x2 table

Table (B-6) Chi-square test of being active of PA and parent allows doing PA at friend's home

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	96.203 ^a	4	.000
Likelihood Ratio	100.795	4	.000
Linear-by-Linear Association	55.673	1	.000
N of Valid Cases	207		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.21.

Table (B-7) Chi-square test of being active of PA and access safe space for doing PA

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.501 ^a	3	.000
Likelihood Ratio	76.096	3	.000
Linear-by-Linear Association	71.876	1	.000
N of Valid Cases	207		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.21.

Appendix C

Questionnaire Of Case Study Of Child Active Physical Activity

What is your name?

Date of interview

yyyy-mm-dd

1- How old are you?

2- Gender

- ☐ Male
- ☐ Female
- ☐ Other

3- Are you studying at school?

- ☐ Yes
- ☐ No

4- What is your education level?

- ☐ Primary Education
- ☐ Middle Education

5- How much daily income amount do your parents have? (monthly is optional)

6- Which physical activity do you do in your free time?

1-Running

2-Walking

3-Jogging

4-Skipping rope

5-Jumping

6-Swimming

7-Hopping

8-Weight lifting

9-BouncingBall

10-Running up and down stair

11-Tag

12-Bicycling

13-Dance

14-Football

15-Badminton

16-Tag of war

17-Dodgeball

18-Hopscotch

19-Relay

20-SackRace

21-Packed

22- Others

Others (Specify)

7- How many minutes did you spend playing those PA in a day?

8-Do you have enough space to do those activities in your living place?

☐ Yes

☐ No

9-Do you go to the playground to do PA?

- ☐ Never
- ☐ Rarely
- ☐ Sometime
- ☐ Often
- ☐ Always

10-Who do you go there with?

- ☐ 1-Father
- ☐ 2-Mother
- ☐ 3-Brother or Sister
- ☐ 4-Grandparents
- ☐ 5- Friend
- ☐ 6-Others (Specify)

11-Did you go to sport club for doing PA?

- ☐ Never
- ☐ Rarely
- ☐ Sometime
- ☐ Often
- ☐ Always

12- How many times do you go to sport club in a week?

13-How many minutes did you spend per time at sport club?

14-What kind of sport you play at the sport club?

- ☐ 1-Football
- ☐ 2-Badminton
- ☐ 3-Volleyball
- ☐ 4-Tennis
- ☐ 5-Swimming
- ☐ 6-Gym
- ☐ 7-Others(Specify)

Others (Specify)

15- Who transports you sport club?

- ☐ 1-Father
- ☐ 2-Mother
- ☐ 3-Brother or Sister
- ☐ 4-Grandparents
- ☐ 5-Others(Specify)

Others (Specify)

16- Who pays you to attend or go to sport club?

- ☐ 1-Father
- ☐ 2-Mother
- ☐ 3-Brother or Sister
- ☐ 4-Grandparents
- ☐ 5-Others(Specify)

Others (Specify)

17- Who do you buy sport cloths and equipment related to PA and sport that you engage in.

- ☐ 1-Father
- ☐ 2-Mother
- ☐ 3-Brother or Sister
- ☐ 4-Grandparents
- ☐ 5-Others(Specify)

Others (Specify)

18-Who do you play with in the house?

- ☐ 1-Father
 - ☐ 2-Mother
 - ☐ 3-Brother or Sister
 - ☐ 4-Grandparents
 - ☐ 5-Others(Specify)
 - Others (Specify)
-

19- How long do you take time doing physical activities with them on daily basic in the house?

20-Do your parents tell you the benefit of physical activities?

- ☐ Never
- ☐ Rarely
- ☐ Sometime
- ☐ Often
- ☐ Always

21- Do your parents do exercise in the house or sport club?

- ☐ Never
- ☐ Rarely
- ☐ Sometime
- ☐ Often
- ☐ Always

22- Who do you exercise with you in the house or sport club?

- ☐ 1-Father
 - ☐ 2-Mother
 - ☐ 3-Brother or Sister
 - ☐ 4-Grandparents
 - ☐ 5- Friend
 - ☐ 6-Others(Specify)
 - Others (Specify)
-

23- Do you have same age friend to play around your home.

- ☐ Yes
☐ No

24- Do your parents allow you to play with friends at friends' home?

- ☐ Never
☐ Rarely
☐ Sometime
☐ Often
☐ Always

25- How many minutes do you play at your friend's home?

26- Do your parents allow you to play with friends outside?

- ☐ Never
☐ Rarely
☐ Sometime
☐ Often
☐ Always

27- Who do you play with outside?

- ☐ 1-Father
☐ 2-Mother
☐ 3-Brother or Sister
☐ 4-Grandparents
☐ 5-Others(Specify)
Others (Specify)
-

28- How long do you take time doing physical activities on daily basic at outside?

29- How many safe outdoor playing space do you have to play at your free time?

30- Do you access the safe outdoor playing space?

- ☐ Never
- ☐ Rarely
- ☐ Sometime
- ☐ Often
- ☐ Always

31- If no, why don't you access the outdoor playing space?

- ☐ Car Traffic
- ☐ Crowded
- ☐ Adult Playing
- ☐ Not cleaning
- ☐ No equipment for playing
- ☐ Other (Specify)

If other, please specify
